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FOOD INDUSTRIES

PRODUCTION . ENGINEERING . DISTRIBUTION

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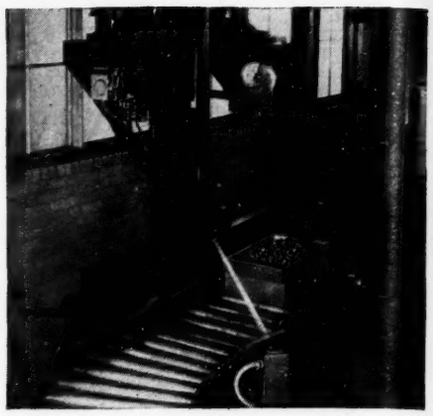
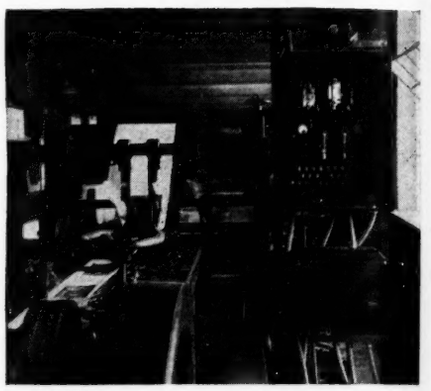
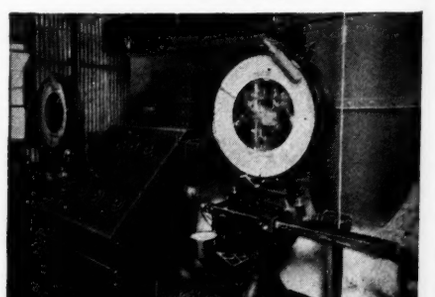
GENERAL ELECTRIC



This G-E "electric eye" is seeing that tote pans slide along the conveyor. If one fails to slide, the "electric eye" sees that no more pans are deposited until the blocking one is removed



Here's an "electric eye" maintaining register in cutting printed paper bags. It has eliminated cumulative errors in register caused by shrinking, stretching, or slipping of the paper web



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---

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FOOD INDUSTRIES

Volume 5 Established 1928—McGraw-Hill Publishing Company, Inc. Number 9

PRODUCTION • ENGINEERING • DISTRIBUTION

NEW YORK, SEPTEMBER, 1933

•

Laurence V. Burton, Editor

Now For Some Constructive Figuring

• Competition between foods themselves is just as important as it is between companies making similar or identical products. Before the New Deal, we could figure fairly well where we stood, but the development of codes for hours of labor, wages and conditions of employment will change all that. The management of every company will find it necessary to recalculate, at this time, not only its own costs but also the probable costs and selling prices of competing products.

• In certain ways, however, there are hidden compensations for some manufacturers under the Blue Eagle plan. The concern which has previously paid the best wages will find a smaller increase of labor costs in prospect under the Blue Eagle, or a code, than those concerns which formerly paid on a lower wage scale. Similarly, the employer who formerly worked his crew a short work-week faces a smaller burden of new wages while complying with his code than one who went in for long hours. In either case, past social virtue on the part of the employer now receives something of a material reward on earth—today.

• Here is where the trouble comes in. The larger the proportion labor occupies in the total cost of a food, the larger the cost increase due to code provisions in comparison with foods in which labor is a lesser item. Hence, it is more than a mere possibility that foods favorably situated regarding the labor item may actually gain a larger place in the national diet, solely because they will bear a lesser new burden of wage increase.

• For example, if the price of one food be increased only five per cent compared to a competitive food, which may have to go up ten per cent, to meet the new labor standards, then it is obvious that the previous price relationships of these two foods will be disturbed to the advantage of the former. And this relationship is capable of further modification through the complex working of processing taxes.

• Competition of this type may be exemplified by bread, macaroni, rice and potatoes; or by preserved fruit, canned fruit and fresh fruit. In the case of sugar made by a variety of processes there now begins an intensification of the competition between the processes themselves. The method for producing a refined sugar which includes the smallest percentage of labor is obviously favored. One may add also other examples of the effects of geographic factors in competition, which may be equally as important.

• Each management official needs to sharpen several pencils and figure these things for himself with reference to products, processes and plants. The result may be a radical change of next year's plant, operating budget and schedules.

AS IT LOOKS TO US

How to Get That Way . . .

One of the great indoor sports of the day is guessing which way commodity markets are going. The average plant superintendent usually is very happy to relinquish to others the responsibility of purchasing such commodities as enter into world commerce and are traded on commodity exchanges, such as flour, semolina, sugar, butter and others.

A few of the most astute buyers have been able to cover future needs for months to come at prices that today are both the envy and the torment of competitors. One such tale that has come to our desk relates to a large chain bakery whose flour buyer has taken a three months' holiday. He was wise enough to cover on his flour requirements until November on the basis of wheat within five cents of its lowest point. Smart boy, that!

Anybody who wants to qualify for that sort of a job must have nerve, good judgment and a willingness to study everlastingly on endless pages of statistics. But few are willing to pay the price.

Bargain—Don't Give . . .

Codes are really bargains by which a manufacturer can obtain certain trade practice concessions from the Anti-Trust Law in return for employment increases. Too many manufacturers are giving away everything without obtaining any real benefit for themselves. Of course, if an industry is so well fixed that the wage increases are no burden, it is perfectly satisfactory to the N.R.A. to leave things as they are.

Electric Brine Tester . . .

Has anyone else ever tried passing an electric current through an ammeter in series with a spark plug screwed into the side of a pickle tank as a device for quick measurement of the salt content of the brine? We have heard of a case where each ampere registered represented one per cent of salt.

No Allocation . . .

Allocation of business under codes, as a possibility is growing more remote as the significance of N.I.R.A. is more fully understood. Monopoly is expressly forbidden under the law. Allocation would be monopoly. Ergo: no allocation. Agreement as to total permitted production, already an accomplished fact in cling peach canning and contemplated in the immediate future in natural-resource industries, is something fundamentally different.

Buyers and sellers will still be able to buy or sell what and where they will. Let no one think, for a moment, that business will come his way by waiting for it.

Pity the Watchman . . .

What are you doing to readjust schedules to your industry code or the blanket agreement? We have asked this question of many superintendents on a recent trip. Apparently we were a month too early. Nobody had done a thing, except to worry about watchmen. The poor old watchman seems to have become a universal industrial problem. Everyone wants to know how to solve it.

A large insurance company suggests taking out more insurance and firing all the watchmen, which solves the problem from the standpoint of the insurance company!

Market Duration . . .

Before embarking on a new enterprise, or in investing in one, it is always a pious idea to make an economic study, not only of the enterprise itself but of the industries which purchase from it. The smartest boys in Wall Street are always careful to learn about the future of a company's market. Equipment and buildings can be purchased, but markets may dry up—sometimes, most unexpectedly. Just to illustrate what may happen, we expose the corner of a card.

Powdered egg albumen was introduced into baking powder some years ago, to give it a selling trick. When mixed into a glass of water the powder containing albumen would "hold its head" after foaming up. And many a housewife was, thereby, convinced—erroneously, no doubt, but nevertheless convinced. Then all manufacturers had to use albumen. It was a selling crutch, nothing else.

But times have changed. The baking powder folks are now becoming a bit tired of buying a lot of albumen every year which, after all, no longer serves the purpose of taking away the other fellow's customers, and so they have all agreed to drop it before long.

You never can tell when something like this will happen. Furthermore, when one food suddenly becomes relatively cheaper than others, the higher priced ones can lose out in much the same way.

Refuse Removal . . .

Slovenly, small canners, of which there are far too many in certain localities in this country, should take to heart the practical value of factory sanitation and cleanliness. Elsewhere in this issue we publish an article on methods of preventing vinegar gnat infestation of raw material. One of the most important methods of control is the removal of the refuse before it has a chance to ferment and become a breeding place for the gnats. In our opinion, the practical reasons for cleanliness and sanitation far outweigh the aesthetic reasons in importance.

No Approval . . .

Protection of foods against insects by fumigation and proper packaging is still so new that many are not aware that it is an accepted process. Companies investigating fumigation for the first time are wont to seek an expression of opinion from the Food and Drug Administration, hoping to obtain their approval of a fumigant. Unhappily, however, this branch of the government is not permitted, under the law, to indorse anything—not even a safe and satisfactory fumigant.

The manufacturer's responsibility lies in the selection of a fumigant which can be easily and completely removed from a food after it has been applied. The government's concern is only with the food after it has passed into interstate commerce and what, if anything, remains in the food after fumigation.

"APPLES *IS* APPLES" . . . *Sometimes!!*

"It was a sizzling, fermenting mess. Every blasted barrel and keg was oozing mincemeat syrup. That corner of the warehouse was a fright."

The Tale of a Mincemeat Explosion

By WALTER H. GRIMES

ANYONE could always tell when the boss was peeved by the funny twist that his mouth took. And when he came to a subordinate's desk instead of sending for him and his mouth looked funny as well, someone was in for the razz, and no mistake. One day Ben Sauerbeck saw him out of the corner of his eye, making for his desk and looking just that way.

"Read that," he said slapping a telegram from Boston on the desk: LAST SHIPMENT MINCEMEAT FERMENTING, BARRELS BLOWING UP. WIRE INSTRUCTIONS.

"Has anybody been tinkering with the formula?" he demanded.

"You know damned well that Old Man Johnson made his own formula and won't take a word of advice from anybody. You couldn't get him to change a single ingredient by so much as an ounce."

"All right; what made that last lot ferment? I thought we went all through that grief, years ago."

"How should I know?"

"I thought you knew everything."

"Well, if it is fermenting, it was not made right."

"So it wasn't made right! Get Johnson up here. I want to tell him you said it wasn't made right."

"What do you expect to find out by that?" Ben inquired. Old Man Johnson had a fearful temper that was a byword around the place. He had been in charge of his department ever since anybody could remember. Nobody could ever go into it without starting a rumpus, and he never left it himself unless the boss sent for him. The old man was not easy to get along with.

"I'll find out who knows the most about mincemeat."

* * *

About twenty minutes later, the old man came in wearing a clean white frock. He was always immaculate, like his department, which was always the cleanest in the plant. The boss asked him to sit down and gave him a cigar, but the old man put it in his pocket.

"Ernie," began the boss, very gently, "when mincemeat ferments and blows up, what makes it do that?"

"Well, Jake," he answered, "if it is made right, it won't ferment."

"If it's made right, will some batches ferment and some not ferment?"

"Never in a thousand years!"

"What makes you so sure of that?" asked the boss.

"Because I know my business," snapped Old Man Johnson.

It looked as if he was ready to fly up and walk out on the boss. He was about the only one around the place who could get away with it.

"I know you do, Ernie; that's why I am asking you," he said in his most soothing manner.

"All right, Jake; what is it you want to know?"

"I'm only trying to find out what makes mincemeat ferment."

"Well, I am telling you it won't ferment if it is made right!" Old Man Johnson was getting hot under the collar again, but the boss was very soft and gentle. He tried a new angle.

"What keeps mincemeat from fermenting when it is made right?"

"Well, you see, it's this way: Everything in the formula is balanced, and when it's balanced it won't ferment."

"Is our formula balanced?"

"You ought to know."

"Do we still use benzoate of soda?" continued the boss.

"Have you authorized any changes of formula?" countered the old man.

"No."

"All right; look at the formula book and you'll know the answer."

"Ernie, will one-tenth of one per cent benzoate of soda keep mincemeat from fermenting?"

"Suppose you try making some without any," crabbed Old Man Johnson.

"All right, Ernie, maybe I will some day. Good-by, Ernie."

* * *

"The old man still runs true to form," complained the boss sort of ruefully to Ben. "You better go up to Boston and see what to do about that car of mincemeat. And don't talk. I want to get to the bottom of this. If Johnson thinks he is being criticized it will be almost impossible to find out what the trouble is."

Next day, Ben, who was the boss' second assistant, was in Boston, and went out to see the shipment. It was a sizzling, fermenting mass. Nearly every blasted barrel and keg was oozing syrup, and the floor was covered with it. The head was busted clean out of one barrel, which takes quite some pressure.

The Boston folks wanted to ship it right back to the factory, for which they could hardly be blamed. That corner of the warehouse was a fright. They shoveled up several pailfuls of syrup and put sawdust on the floor to soak up the rest. Ben told them to hold the shipment until he wired them disposition from the home office.

Then he recorded all code marks and shipping data, then filled a kit with some of the fermenting stuff, which was otherwise O.K. It seemed to smell a little stronger of rum than usual, he thought, but that was to be expected, because it was fermenting. Then he filled a kit from one of the other barrels that were not fermenting, and was back at the main office the following morning.

* * *

At 11 o'clock the boss had the "wrecking crew" out in the sample room. The two kits of mincemeat were on the table. One of them was beginning to run over, because when it ferments, mincemeat seems to swell up.

Old Man Johnson was there, not saying a word, looking more dour than ever.

"I have asked you to come together to advise me on the cause of fermenting mincemeat," began the boss. "I have found by telegraphing around that our stocks in all warehouses are O.K. except at Boston, Buffalo and St. Louis. Here are samples of the stock at Boston. One is fermenting and the other is not. The original code mark on the barrels showed that the fermenting one was made here only three weeks ago. The other was made about four months back.

"Ernie, you told me yesterday that you had not changed the formula."

"I did."

"Is it possible that your help could have made a mistake in putting up a batch?"

"Not a chance in the world."

"Then is there any other explanation for a part of this year's pack fermenting and the other not fermenting?"

"Jake, I have been here for twenty-eight years and this is the first time there has ever been a complaint about my work. I made mincemeat in Baltimore for twenty years before I came here, and nobody ever found fault before."

Tears began to come into his eyes, and his voice grew husky.

"I'm afraid I am getting too old. You can have my job; I'm through."

"Forget it, Ernie; nobody wants your job. All we are trying to do is——"

"No use, Jake." I'm through."

There was an air of tragic finality about the old man. All his life he had repelled friendly overtures. Apparently he couldn't understand friendship.

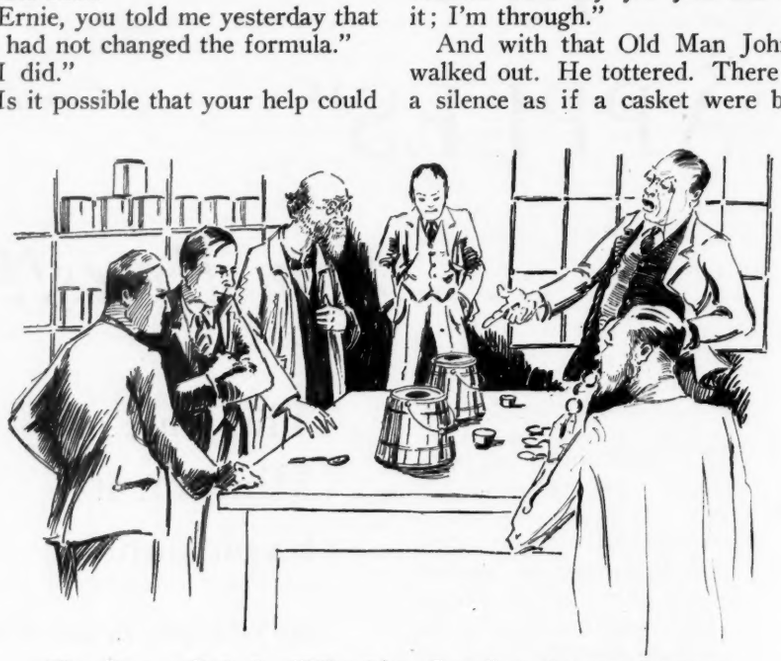
"Then you admit that the fermenting mincemeat is your fault?"

"I do not!"

"Well, what are you quitting for? All I am after is an explanation of the cause of some our mincemeat fermenting."

"I tell you, Jake, that mincemeat has been made exactly the same way for the last ten years. I weigh everything myself and I never make a mistake. If anything went wrong it was not in my department. If you fellows want my job you can have it; I'm through."

And with that Old Man Johnson walked out. He tottered. There was a silence as if a casket were being lowered into a grave. You could almost hear the words, "Ashes to ashes, and dust to dust."



The Boss called the "Wrecking Crew" to the sample room.

* * *

The boss turned to the chief chemist and said, "Take that stuff to the laboratory and get it analyzed by this time tomorrow. That's all, boys."

* * *

There was another powwow next day, minus the old man. He had come to work, but had refused to come to the meeting. The chief chemist reported that the fermentation was caused by yeast and that the product was not spoiled, though it was unmerchantable. It would have to be remanufactured. He submitted the following analyses:

Ingredients	*Fermenting Mincemeat*	*Good Mincemeat*
Total Sugar	36.7	43.7
Alcohol	2.3	2.0
Benzoate of Soda	0.077	0.080
Water	41.1	34.2

(Turn to page 342)

How to Control BANANA RIPENING

By **C. F. GREEVES-CARPENTER**
Altadena, Calif.

WHILE the banana is only one of several fruits that show degree of ripeness by color change in peel or rind, it particularly lends itself to a definite cycle in handling so that it may reach the ultimate consumer or user at the very peak of its quality. The chart graphically illustrates this cycle in terms of sugar content as well as color change and period of elapsed time after cutting from the tree.

As the ripening is an enzymic action in which the starch content of the fruit is changed to sugar it is subject to temperature and humidity conditions that play a more important part than elapsed time.

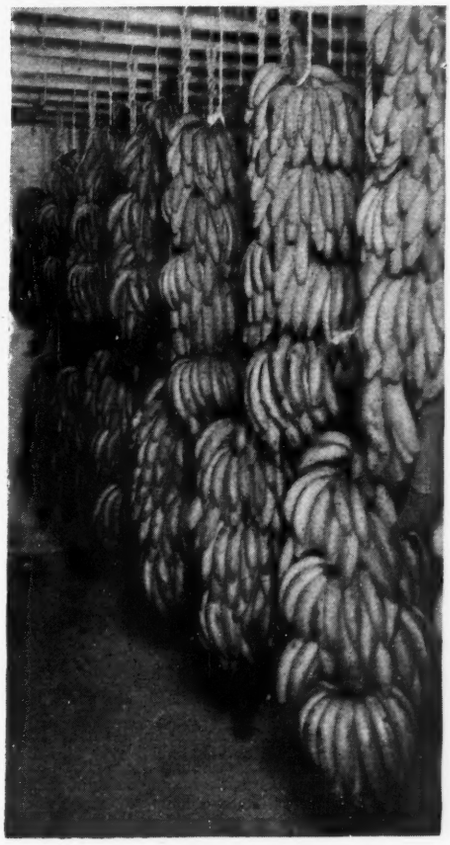
Although bananas are used as food in other forms, they are best known to us in the fresh fruit state. Grown principally in Central America, Mexico, Colombia, and the West Indies, they enter this country chiefly through the ports of Boston, New York, Philadelphia, Baltimore, New Orleans and San Francisco.

Owing to their susceptibility to damage during handling, and to the rapidity with which they become unfit for consumption after they begin to ripen, they are shipped green to be ripened at port of arrival or at certain centrally located interior points to which they may be freighted under refrigerated conditions.

The process of ripening, within definite limitations, may be lengthened or shortened to meet the distributional requirements. When ripened to the correct degree, prompt distribution to the retailers is essential so that the fruit may be sold and consumed before it becomes overripe. Of course, there is some variation in the green bananas, depending on the soil and climatic conditions under which each shipload has been grown. Then, too, the time consumed in transportation from the tropics to the port of entry has to be taken into consideration, as that period may be as little as four days (Honduras to New Orleans) as as much as eight days (Colombia to Boston).

Methods of determining ripening treatment to be used depend upon the average character of the shipload and the possible stem variation. Practically each lot has different ripening characteristics. The time required for ripening is indicated by the chart, depending considerably upon the maturity of the bunches at the time of cutting and the extent they may have ripened on the voyage. When properly ripened, the fruit has a firm pulp and peel substance.

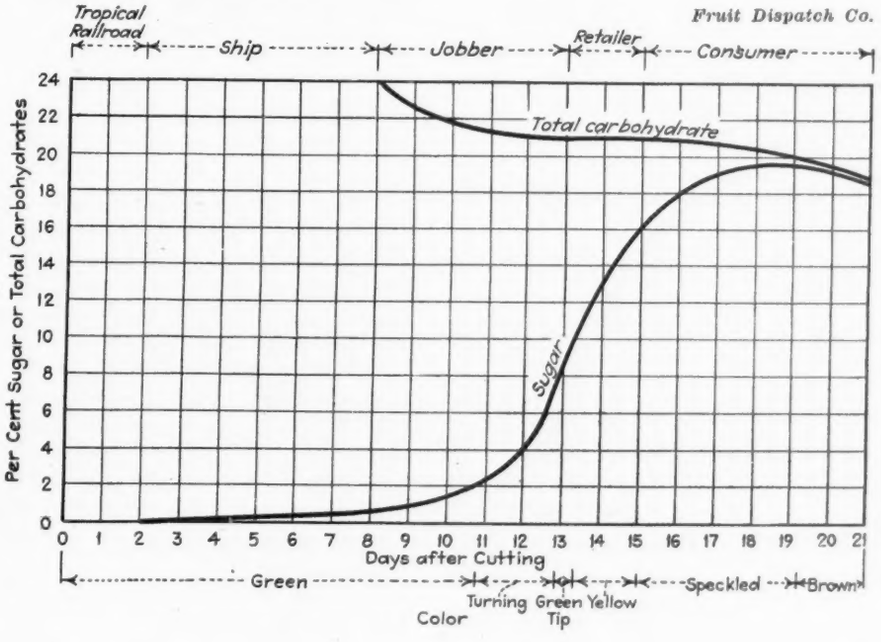
As previously stated, ripening is controlled by temperature and humidity. The most desirable temperature has been found to be from 62 to 68 deg. F. When rapid ripening is necessary to meet marketing needs, the temperature is increased as much as 3 deg. F. per hour within that temperature range without its having any injurious effect on the fruit.



Fruit Dispatch Co.

IN A TYPICAL RIPENING room the bananas are hung in two tiers. Treatments vary to allow fast, intermediate or slow ripening, and 3-4, 5-7 and 8-10 days respectively are allowed with green fruit of average ripening characteristics.

NATURAL ENZYMES in a few days' time convert the starch content of the green banana almost completely into sugar. This ripening is evidenced by a change of color in the skin from green (unripe) to yellow, then to yellow flecked with brown (ripe). The fruit ripens from center out as the enzymes convert the starch first into sucrose or crystalline sugar, then into invert sugar. The fully ripened fruit contains approximately half its sugar content in the form of sucrose and half as invert sugar.



When the fruit begins to color, the temperature is reduced to 66 deg. F. and held at that point. During the warming period heavy condensation of moisture on the fruit takes place, which seems to have a beneficial effect. When it is necessary to hold the ripening fruit in an almost static state to prevent over-ripening, the temperature around 56 deg. F. has been found most satisfactory. The relative humidity of the ripening room is an important factor and is usually kept at 90 to 95 per cent. Otherwise, an excessive shrinkage in the fruit results. As soon as the bananas have colored, the relative humidity is reduced to about 80 per cent. The practice of confining the carbon dioxide gas given off by the fruit during the process of ripening, is important, as it has been observed that the bananas ripen more evenly in its presence than if it is expelled from the room. Ventilation, until the fruit has colored, is avoided, except that required for the safe operation of the gas-burning heaters. When the fruit has colored, the air in the room is changed three or four times every hour.

From five to seven days is the average time required to accomplish ripening at a medium rate. The use of ethylene has been found to increase coloration and the speed with which changes are made within the pulp, but it is seldom required in medium or slow ripening. When used, however, the concentration employed is one cubic foot of ethylene gas to every thousand cubic foot of room capacity. Two or more successive applications are given the fruit.

The physical and chemical changes which take place during the ripening processes are partially indicated on chart I. Total carbohydrates remain fairly constant during ripening, but the starch decreases from over 26 per cent to a little more than one per cent while the sugars increase from less than one per cent to about 19½ per cent.

The green appearance of the unripe banana peel is due to the presence of chlorophyll, which, during ripening, disappears under the influence of enzymic activity. Xanthophylls and carotin give the ripe banana its characteristic luscious yellow color. At the same time there is a natural softening of the banana pulp during the change from the hard insoluble condition of the green fruit with low sugar content to that of the edible state with about 19½ per cent sugar.

Apples Is Apples . . . Sometimes ! !

(Concluded from page 340)

"What's the big trouble here, Joe?" asked the boss.

"He's got a lot of water in it somewhere."

"If he slipped up on the weight of syrup in a batch, would it account for the water?"

"No, I don't think so," said Joe, "and anyhow he's got at least 150 batches that went cockeyed. He might have made a mistake once, but not 150 times. I think the trouble is somewhere else."

"I see one is low on benzoate. How about that?"

"No. You'd need about three-tenths of a per cent to stop that wet mincemeat from fermenting. If it is made according to formula, you don't need even as much as a tenth of a per cent. Everything is all right except the sugar and water."

"You are sure?"

"Sure I am. You let me handle it with the old man from now on. I helped him get up the formula. He will talk to me where you fellows can't get a word out of him. I think I know what went wrong."

"What was it?"

"I'll tell you this afternoon, if I can find the old man."

Joe went to see Ernie Johnson, who was cleaning out his desk, preparatory to quiting the job he had held for the last twenty-eight years.

"Hello, Ernie. I hear you're quittin'. Came to say good-by."

"Yes, Joe. I guess I'm getting too old for these young whipper-snappers."

Aw hell, Ernie, you ain't 70 yet. After you get to be 70 you can get a job night-watchin', and when you get to be 90, they put you on a pension. Nobody ever quits around here until they are 90."

"Well, I'll be damned if I'll let them tell me I don't know how to make good mincemeat."

"What do you suppose went wrong with them three cars, Ernie?"

"I don't know, Joe. Do you?"

"No, but I've been thinkin'."

"Well, I wish you could find out."

"Ernie, you didn't buy any dried apples this fall. What did you use instead?"

"Fresh ones."

"Did you cut down on the water in your syrup when you used the fresh apples?"

"No; why should I? Applies is apples, ain't they?"

"Yes, but according to the way I figure it, if you use fresh instead of dried apples, you are putting about 77 lb. of water into every batch and you're cutting out about 10 to 15 lb. of sugar. Remember how you used to tell me when I was a kid that it was hardest to make a moist mincemeat that would keep, out of anything but dried apples?"

The old man made meaningless marks on a piece of paper for a moment.

"Guess you're right, Joe. They'll fire me now instead of letting me quit. I never did have much education. I can't figure these things out."

"Naw, Ernie, they won't fire you, if you promise me just one thing."

"What's that?"

"Let me know whenever you buy anything, so I can have it analyzed and keep you out of trouble."

"All right, Joe, I promise."

That afternoon when the boss called Johnson into his office and offered him a cigar, the old man smoked it instead of putting it into his pocket. Nobody ever knew exactly what happened in there, but after a while they shook hands and Old Man Johnson went out smiling and puffing big clouds of smoke.

The boss looked at Ben and winked.

$39,000 a Year . . . *Saved on* COAL *and* ELECTRICITY

By N. A. CURTISS
Consulting Engineer
Ridgewood, N. J.

EDITOR'S NOTE—*It is self-evident that a concern cannot save a large sum of money unless it has previously been spending it. Nevertheless, a small plant can utilize the principles here described and avoid waste. During the New Deal Era of high wages and the necessary industrial readjustment which must follow, in the power and steam services are places that must receive the closest technical scrutiny for possible economies.*

TO BE able to save an annual sum of $39,000 in the power and steam costs of a single food manufacturing plant is unusual, and it is possible only under unusual conditions, such as were found here. However, the methods employed are applicable to other plants irrespective of size, and commensurate savings can be made where uneconomic conditions exist.

The concern where this work was carried out is an old one. The plant has grown to a very large size by additions and purchase of adjoining plants. Naturally, nothing has been built to what might be called the master plan. There were two boiler plants; engines and generators were located at miscellaneous points; some were not in use; others were overloaded.

Electric power requirements were for 220-volt and 110-volt a.c. and 110-volt d.c. Much electricity was purchased under a rather unsatisfactory contract. Hot water was wasted in a 4-in. stream. The whole set-up constituted a major problem of power-plant engineering, heat balance and cooperation with the production department.

When the rehabilitation and revamping had been carried to the limit that was economically justifiable, the annual saving in cost of steam was over $23,000 and the cost of electric power was reduced by $16,000.

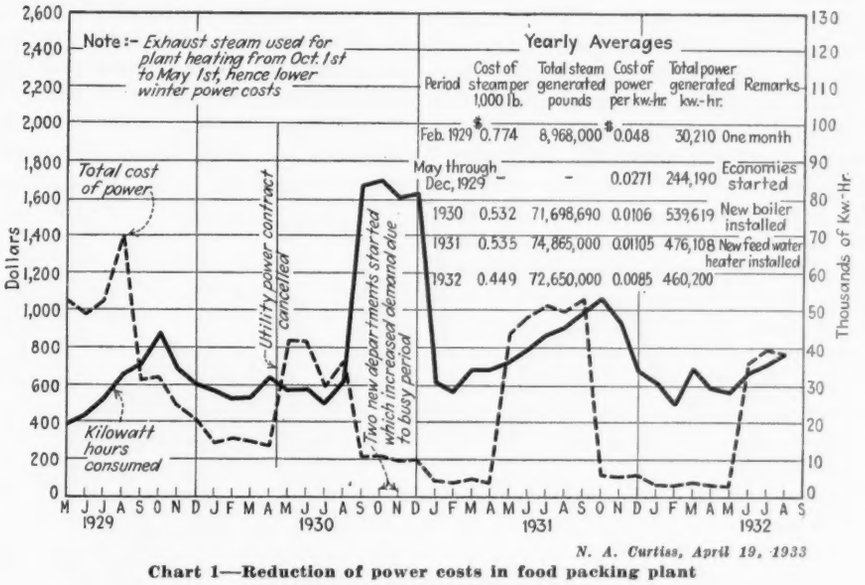

Note:- Exhaust steam used for plant heating from Oct. 1st to May 1st, hence lower winter power costs
Yearly Averages
Period | Cost of steam per 1,000 lb. | Total steam generated pounds | Cost of power per kw-hr. | Total power generated kw.-hr. | Remarks
Feb. 1929 | $0.774 | 8,968,000 | $0.048 | 30,210 | One month
May through Dec, 1929 | - | - | 0.0271 | 244,190 | Economies started
1930 | 0.532 | 71,698,690 | 0.0106 | 539,619 | New boiler installed
1931 | 0.535 | 74,865,000 | 0.01105 | 476,108 | New feed water heater installed
1932 | 0.449 | 72,650,000 | 0.0085 | 460,200
Total cost of power
Kilowatt hours consumed
Utility power contract cancelled
Two new departments started which increased demand due to busy period
Dollars
Thousands of Kw.-Hr.
M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S
1929
1930
1931
1932
N. A. Curtiss, April 19, 1933

Chart 1—Reduction of power costs in food packing plant (based on actual operating reports).

When the investigations into the power plant were started in 1929, the cost of 1,000 lb. of steam was $0.774, but in 1932 this unit of cost had been reduced to $0.449, with the same methods of figuring costs employed in each case. The 1932 figure, however, included the depreciation and interest figures on approximately $45,000 worth of new equipment, which was two and one-half times as great as the similar figures for 1929. The average yearly consumption of steam for the past three years has been between 70 and 75 million pounds. Approximately 25 per cent of this was used for power and plant heating. The remaining 75 per cent was used as process steam. Despite the fact that additional steam-consuming operations have been installed, the elimination of waste has kept the steam production practically constant.

In a similar manner the cost of current in 1929 was $0.043 per kw.-hr., which was reduced to $0.011 for the average yearly cost in 1931 and 1932. The average power consumption has reached 500,000 kw.-hr. annually.

In figuring the cost of both steam and power over the entire period, the items which made up the cost figures were: labor, materials, supplies, depreciation and interest on the cost of new equipment. No charge was made for building maintenance or floor space.

The plant covers about 275,000 sq.ft. of floor space spread over about seven-eighths of a city block. It comprises two five-story concrete buildings, one six-story concrete building and seven smaller brick buildings varying in height from one to five stories. One group of buildings had been taken over with a complete boiler and power plant, but, on account of disuse, the boilers deteriorated rapidly and were condemned about the time that our studies were started. The power plant which was taken over consisted of three small

steam-driven generators totaling 125 kw. and were arranged to produce 220 volts d.c., but because 90 per cent of the requirements was 110-volt d.c. these generators had also been idle for a long period of years. However, when examined and started up they were found to be in excellent condition.

The main boiler plant comprised five boilers totaling 950 boiler horsepower at normal rating in 1929. On one of these boilers a Dutch oven had been built into the side of the firebox for burning wood and refuse. This incinerator was not constructed in a manner to utilize the heat efficiently, and the only benefit derived was to get rid of the refuse. The heat produced was offset by the excess of cold air which was drawn into the boiler breeching and chimney.

All of the boilers were connected to a common steam header so that the pressure of the entire boiler plant had to be reduced to conform with the lowest of the allowable pressures in the bank of five boilers. Two of the horizontal return tubular boilers (one of which was the one with the Dutch-oven incinerator) had been weakened by getting oil in the boiler water, and the plant steam pressure had been reduced to 90 lb. per square inch, although some of the boilers could individually stand much higher pressures. Greater efficiencies can be obtained in pumps and engines by carrying higher working pressures.

Electric Current Not Standard

The main power room contained one large corliss engine and generator which carried the greater part of the load and was capable of carrying an increased load up to a constant load of 1,600 amp. A smaller Armington & Sims engine and generator was designed to carry a 600-amp. constant load, but, due to poor foundations and needed repairs in the cylinder and valves, it was never loaded over two-thirds of its rated capacity. In addition to this there was the Edison break-down service generator, which delivered 110-volt d.c. Also under the utility contract there was additional electric service which was distributed directly from the incoming panel boards. About 90 per cent of the equipment in the plant required 110-volt d.c., 8 per cent used 220-volt a.c., two-phase, and the remaining 2 per cent was 220-volt d.c.

Utility companies are eliminating the d.c. service as fast as possible and are supplying 110- or 220-volt a.c., three-phase. If we had been starting a new plant it would have been wise to conform to the commercial practice, which has been found to be most economical in the long run, but as there were many thousands of dollars worth of equipment in the plant which required the use of 110-volt d.c., it was agreed that we should standardize on that type of current wherever practical to do so.

Unprofitable Conditions to Be Corrected

The principal unprofitable conditions which demanded our immediate attention are listed below and will be described later in detail, with the remedies which were made or recommended:

1. The breakdown electrical service contract.
2. Boiler equipment.

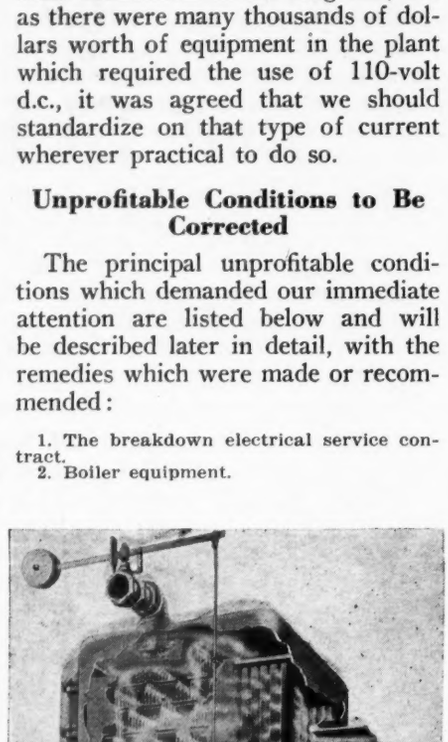


Fig. 1—Raising of feed-water temperature from 195 to 218 F. before it enters the boiler accounts for a considerable saving in fuel consumed. In the plant under discussion the yearly saving was as much as $407.

3. The feed water heater was 26 years old, too small for the boiler plant, required excessive maintenance and was of obsolete design.
4. Too many types of current were in use.
5. A 4-in. stream of hot water flowed to the sewer all the time the plant was operated; steam was being lost at many points in the plant and to the sewers.
6. Numerous direct-drive compressed-air units were scattered throughout the plant requiring separate and in some cases excessive maintenance.
7. The cold-storage-plant equipment was badly out of repair.
8. Cooling water for compressors was used only once and passed to the sewer in its original pure state, only slightly warmer.

Breakdown Electric Service Contract

The utility contract called for a maximum demand of 175 kw. and a minimum cost per month of $351, or a total of $4,212 per year. Months with a high cost of current would build up a credit which was used to balance the low-cost months during any one contract year.

When our studies commenced, the charges for purchased electric power had gone over $500 per month, with the prospect that new equipment installations would increase the bill to over $600 per month if steps were not immediately taken to transfer loads wherever possible to the private power plant, which could at this time carry an additional load.

In justice to the utility company, it should be stated that the reason for having this type of contract was because the food company generated part of its own power. Hence it was impossible for the utility company to offer a more favorable contract. The result was that the purchased current cost was at an excessively high rate, while the private plant furnished more current for much less money.

The above facts can readily be established by reference to the curves shown in Chart 1. It was also clearly seen that unless we removed a large percentage of the load from the outside service we should not be able to reduce our future monthly payments and keep within the yearly minimum of $4,212. The sudden rise in the cost of current in August, 1929, was inexcusable and is explained by a misinterpretation of instructions. The low cost of power during the winter months was due principally to the fact that exhaust steam was used for heating the plant, and, as at least 90 per cent of the heat is retained in the steam when exhausted from the engine, only 10 per cent of the steam cost is charged to power production.

Cancel Outside Contract

Before we could eliminate the outside service we had to provide means for supplying 220-volt two-phase alternating current and 220-volt direct current for regular operations, and in addition to this we felt that we should provide some additional source of supply for 110-volt current in case there was a breakdown on the large corliss engine. Accordingly, by reconnecting the three small generators which had been idle for several years, but still were in excellent condition, installing a new switch-

board near these generators and a connecting line between this and the main switchboard and installing a motor-generator set which could be driven from either power plant, we gained a capacity to take care of an emergency load of between 1,000 and 1,200 amp. The outside contract was cancelled in April, 1929. Since that time the load has been removed from the motor-generator set as much as possible, with the result that at times of low production in the factory it has been possible to shut down the motor-generator set for part of the day.

Again referring to Chart 1, it will be seen that the power production in kilowatt-hours has been greater at times than before cancellation of the outside contract, but the new arrangement has met all demands upon it at a greatly reduced cost. However, during recent periods of heavy production there has been a surge of excessive loads which have served as a warning that the engine and generator capacities were insufficient to handle increased loads due to new installations. This will be discussed in detail under engine equipment.

Boiler Equipment

In June, 1930, one of the boilers developed a serious weakness, which resulted in its being disconnected and its use stopped at once. This was the boiler with the Dutch-oven incinerator attached. However, its elimination reduced the boiler plant capacity to only 800 boiler horsepower at normal rating.

After thoroughly analyzing conditions and requirements, the purchase of two 300-hp. water-tube boilers with working pressures up to 200 lb. per square inch, equipped with superheaters to give 100 deg. of superheat and equipped with soot blowers, was recommended. The boilers were installed in tandem with suitable high settings to allow for the installation of oil-burning apparatus in the future.

After installing these new boilers, a new feed water heater and a feed water pump, and still using the hand-firing method of feeding coal to the boilers, the evaporation of water per pound of coal has gone as high as 15 lb., which is an indication of high efficiency in the boiler plant.

Feed Water Heater

The main purpose of any feed water heater is to provide hot water for the boilers with as high temperature as possible. Without a feed water heater, the excessive expansion and contraction of the boiler parts due to the addition of cold water will cause rapid destruction of the boilers and greatly reduce the boiler horsepower capacity.

An undersized feed water heater approaches the adverse condition of no heater at all. The one which we had was 26 years old and designed for 400 boiler horsepower, whereas our boiler plant had a normal rating of 950 hp. until 1930, when the two new boilers were installed and the total capacity increased to 1,274 hp.

The study of the feed water situation included plant hot-water heating and future expansion. A comparison of different makes was made in conjunction with the space available for the equipment in the boiler house and a new de-aerating feed water heater was recommended and installed in 1931 with ample capacity for future expansion of the boiler load and allowance made for taking care of the plant hot-water system in the future.

The average temperature of the water entering the boilers with the old heater was 195 deg. F., while with the new heater the temperature was 218 deg. F. This one item alone translated into dollars shows a conservative saving of $407 per year in the coal pile. There were many other up-to-date efficient features embodied in this heater, so that it contributed materially to the over-all savings which were made in the cost of steam.

In any plant composed of small groups of buildings which have been taken over from time to time, it is inevitable that certain conditions will be carried along from previous owners. This is exactly what happened in this plant with respect to the current used in different buildings. Ninety per cent of the current used in the plant was 110-volt d.c., and it is obvious that it would be more efficient and convenient if only one type of current were used.

While none of the current used in the plant is of the type which commercial practice has shown to be most economical, the expense of changing all of the equipment would be prohibitive. Even the expense of changing all the current to 110-volt d.c. was not justified, as some of the equipment using the other current included elevators and large motors, and the expense of changing over a large freight elevator from one current to another was not justified. However, there were numerous points where standardization could take place at small expense and, with the general policy of standardization always in mind when replacing motors, a close approach to a standardized condition has been obtained. At times it is now possible to close down the motor-generator set which handles the non-standard current for part of the day when shipping loads are light.

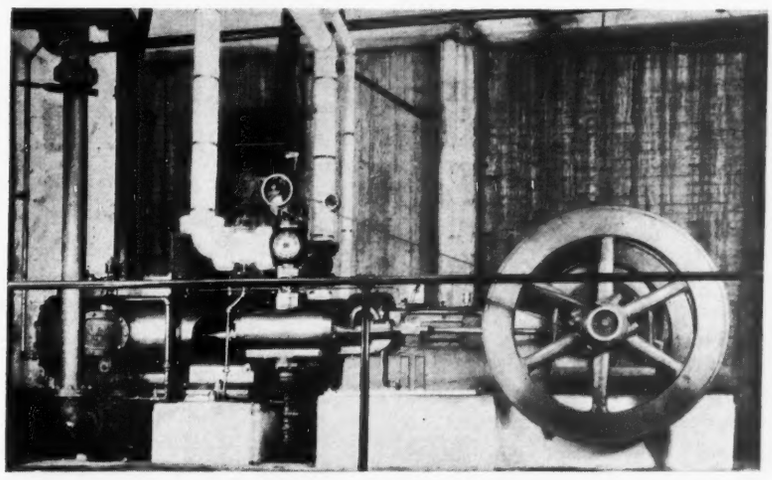


Fig. 2—A new steam-driven air compressor took over the work of small electrically operated compressors. This puts the load on the boiler plant directly instead of through the intermediate motor-generator set which at times was carrying no load other than the compressors.

Water and Steam Wastes

The elimination of steam and water waste necessitated an intelligent survey of all steam lines, replacing worn-out traps, repairing traps that were still serviceable and installing traps in some places where

(Turn to page 352)

CHANGES *which may occur* IN FROZEN FOODS *during Cold Storage*

By DONALD K. TRESSLER
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Gloucester, Mass.

MANY persons have assumed that properly quick-frozen foods will remain unchanged indefinitely during long-continued cold storage. Recently certain investigators have recommended storage temperatures as high as 15 to 20 deg. F., but these workers either have not held their products for long periods or have not compared their products with similar ones kept at lower temperatures. In order to clarify the situation, the following consideration of some of the problems encountered in the cold storage of commercially quick-frozen foods is presented.

In general, the changes which may occur may be classified as physical, chemical and enzymic. The chief deleterious physical changes are desiccation and growth in the size of the ice crystals. Since it is difficult to differentiate between chemical and enzymic changes, and since the changes effected by enzymes are chemical in nature, they will be considered together. Most enzymic actions occurring in foods during cold storage are either oxidative or hydrolytic in nature. These actions are understood fairly well, but little is known about the changes in colloidal structure which occur in many products of high protein content such as meats, although in some instances means of controlling these changes have been found.

Bacteria, molds and yeasts do not multiply appreciably at temperatures below 20 deg. F. and so the changes produced by organisms are negligible. As a matter of fact, the numbers of organisms decrease during storage. This is especially true in the case of acid fruits, in which the reduction in numbers of countable organisms is very striking. Berry, of the Bureau of Plant Industry, has found that the reduction in bacterial count of fruits during freezing and subsequent cold storage is between 90 and 99 per cent.

In our own laboratory we have recently studied the effects of quick-freezing and subsequent storage on the bacteria of Hamburg steak. In the case of this product, freezing destroys about 80 per cent of the organisms. Thirty days' storage of the quick-frozen product effected an additional destruction of about 35 per cent of the remaining organisms.[1]

The physical changes occurring in frozen foods are better understood than the chemical and enzymic. Desiccation (drying) occurs rapidly in unprotected foods and produces changes which are very noticeable. Desiccation which has taken place unevenly over the surface produces characteristic light spots called "freezer burn" or "pock marks." Desiccation often occurs very unevenly from the skin of dressed poultry. The small holes left by the removal of the feathers may turn white; these white spots gradually enlarge until they become very objectionable. The writer's theory is that the uneven desiccation in dressed poultry occurs because there is a layer of fat lying immediately under the skin which retards desiccation. The removal of the feathers causes breaks in the layer of fat. Thus water evaporates more rapidly through the pores left by the removal of the feathers and leaves small, while, circular desiccated areas commonly called "pock marks."

When desiccation occurs uniformly its effects are just as objectionable, but it is not so easily observed. Severe desiccation causes a considerable loss of flavoring components, and makes the frozen product tougher, less easily cooked and, therefore, less desirable for food.

Under certain cold-storage conditions, the size of the ice crystals may grow. If the temperature at which the foods are stored is sufficiently high and if a considerable fluctuation is permitted, the ice crystals of quick-frozen products may actually grow to be as large as those in slow-frozen products. Perhaps this is a little difficult to understand, but when you consider that it has been definitely proved that all of the water in beef and fish is not frozen until these products are carried 50 or more degrees below 0 deg. F., it may be easier to believe. Recently Dr. Finn, director, Fisheries Experimental Station at Prince Rupert, has shown[2] that in the case of fish at 18 deg. F., only 89 per cent of the total water present is frozen; at 24 deg. F., 83 per cent; and at 28 deg. F., only 61 per cent of the water is frozen. Now if fish which are carried down to 18 deg. F. in the freezing processes are allowed to warm up to 28 deg. F., although they still will appear to be hard frozen, about one-third of the total water which was frozen at 18 deg. F. will have thawed. Then if the temperature of the storage is reduced, this water will again freeze. In this case it will solidify very slowly. Under such conditions new ice crystals will not be formed but those present will grow in size. It will be evident that only a few such fluctuations are needed to change the minute crystals of quick-frozen fish to a large size, approximating those of slow frozen fish.

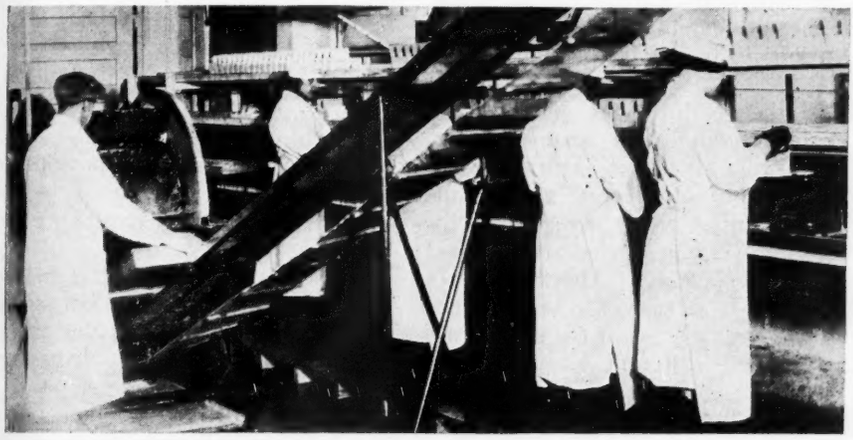
Enzymes—An enzyme is a substance of animal or vegetable origin which alters the speed of chemical reactions without itself being completely changed by the action. In other words, it is a catalyst of bio-

[1]Paper presented by Geer, L. P.; Murray, Wm. T., and Smith, E.: "Bacterial Content of Frosted Hamburg Steak," at annual meeting of Am. Pub. Health Assoc. on Oct. 22, 1932, in Washington, D. C.

[2]Finn, B. B.: Advances in Knowledge of Freezing. Progress Reports of Pacific Bio. Sta., Nanaimo, B. C., and Fish. Exp. Sta., Prince Rupert, B. C., No. 14, pp. 3-5.

logical origin. Both of the above definitions may be open to some criticism, for true inorganic catalysts are not in themselves affected at all by the reactions which they bring about, whereas enzymes are gradually used up by the processes which they effect. However, the definitions are substantially correct, as one part by weight of an enzyme will transform a truly enormous number of parts of its substrate (the substance upon which it acts) from one form to another. These enzymes are the substances which makes it possible for plants and animals to effect reactions in their tissues which are very difficult to bring about in a chemical laboratory.

The freezing operation kills fruit and vegetable tissue and upsets the nice equilibrium of cellular substances which make the processes of life possible. When this occurs, enzymes turn upon and destroy the tissues which formed them. At the very low temperatures of cold storage these reactions of autolysis, as they are called, go on very slowly, but, nevertheless, their effect is noticeable in some products after only a few months' storage, especially if temperatures much above 0 deg. F. are employed. Easily oxidizable fruits and unblanched vegetables may be seriously affected by enzymic actions.



In quick-freezing, temperatures and packaging materials are chosen with the object of preventing as many changes as possible in foods during storage and shipment.

Oxidation—Oxygen comprises approximately 21 per cent of the volume of the air in a cold-storage room. Since this element is very active it reacts with all of the highly active components of the foods, producing undesirable changes. For instance, fatty fish, such as salmon and mackerel, contain large quantities of unsaturated fatty oils which readily absorb oxygen from the air. This causes a darkening of the flesh of the fish, first on the surface and finally throughout. The fishery technologist calls this reaction "rusting," probably because the color of oxidized herring is about that of rust. The fat of rusty fish has a rancid flavor and is no longer appetizing.

The flavoring components of fruits also are very easily oxidized. The characteristic flavor of orange juice is lost in a few hours at room temperature because of this action. Frozen orange juice containing oxygen does not lose its flavor so quickly, but it does so none the less certainly. A slice of apple or peach, when exposed to air at room temperature, soon turns dark. This action also is one of oxidation. Overholser[3] has demonstrated that the substance which turns dark is a complex tannin containing a catechol group. Oxidized apples have a flavor resembling that of dried apples, which get that characteristic flavor because of the long-continued oxidation at room temperature. Hulled strawberries soon attain an overripe flavor when exposed to the action of the oxygen of the air.

Unblanched vegetables lose their natural flavors and develop "alfalfa hay" flavors during cold storage for relatively short periods of time. Asparagus and snap beans are vegetables that are particularly easily oxidized. In the case of vegetables these actions have not been definitely proved to be oxidative in nature; however, there is no question but that they are catalyzed by the presence of enzymes, which also catalyze oxidation reactions.

[3]Calif. Agr. Exp. Sta., *Tech. Paper* 7 (1923).

Fruits gradually lose their bright colors and turn dull and then dark. Similarly, vegetables, particularly asparagus and green beans, lose their brilliant green color and become a drab olive.

During these oxidation reactions the carbohydrate content of fruits decreases and the organic acids present increase. It may be assumed that the oxidation reactions change carbohydrates and proteins to acids.

Hydrolysis—The fats of meat and fish slowly react with water during cold storage, forming glycerin and free fatty acids. The extent of this action is noted by the chemist by measuring the increase in the free fatty acid content of the fat. Hydrolysis ordinarily occurs simultaneously with the oxidation of the fat, and taken together these two actions are called the development of rancidity.

During long-continued cold storage the proteins may be gradually hydrolyzed to simpler compounds such as proteoses, peptones, polypeptides and amino acids. Such reactions are objectionable, as the decomposition products never possess the flavor of the original proteins.

Sugars are often hydrolyzed and may thus lose a portion of their sweetness. In the case of sucrose, this reaction is known as inversion, and the products are dextrose and levulose. This action may be definitely demonstrated in fruits and some vegetables.

Coagulation—Even less is known about coagulation than about the other chemical actions described above. It is my opinion that many proteins gradually lose a portion of their chemically combined water and become coagulated, thus losing their usual colloidal (jelly-like) condition. This action is noted in frozen fish by a gradual increase in the leakage of the fish (which occurs on thawing) during long-continued storage.

The fibers of fibrous vegetables gradually become tougher during storage. This may be caused by an action similar to the coagulation of the protein. Because of the tendency for fibers to toughen, it is necessary to be extremely careful in the selection of vegetables for quick-freezing. Snap beans containing fiber in the side walls cannot be used for quick-freezing. Similarly, fibrous asparagus does not make a satisfactory product.

(Next month Dr. Tressler will state briefly how some of the changes may be controlled—Editor.)

CRANBERRY JELLY

. . . *How it is made* . . .

By R. E. COX
California Fruit Growers' Exchange
Ontario, Calif.

The natural quick-setting pectin is replaced by prepared slow-setting pectin

AS POINTED out by Urann,[1] cranberry sauce is in reality a jelly. However, it is a rather specialized type. It is much too firm to be an ideal jelly, hence it does not spread easily. As a result, its use, as originally intended, is limited to that as a relish to be eaten with meat.

Cranberry sauce is firm because of its high pectin and acid content. It is low in total solids. When an attempt is made to prepare a normal pure fruit jelly from cranberries, difficulties are encountered. A normal jelly should be composed of equal weights of fruit juice and sugar, boiled to a sugar concentration of about 65 per cent. If that procedure is followed with cranberries, the tendency for the mass to set is so great that gelation occurs before boiling has been completed. The result of further boiling or pouring is to break up the continuous jelly structure, giving a mass of small jelly lumps which will not retain the shape of the container when turned out onto a plate. In addition, the product is sticky and cannot be cut into attractive pieces for individual servings. Fig. 1 shows two jellies which have undergone premature setting, contrasted with one which, like a normal fruit jelly, set after reaching the glass.

The making of fruit jellies is old in years, but it is only during the past generation that significant progress has been made in its development through the application of basic principles.

By the use of prepared fruit pectin, results have become more certain, yields have been greater, and better jellies are being produced even in shorter time and with less effort. Furthermore, jellies from many fruits low in natural pectin have been made practicable and unusual products, such as honey jelly,[2] have been made possible.

Before jelly making could be transformed from its status as an art to a technically understood and controlled process, it was necessary to realize that fruit jellies have four essential ingredients: pectin, acid, sugar and water. These ingredients are important as to origin and function and should be considered according to their rôle in jelly formation.

Mother Nature may generally act in an exceedingly wise manner, nevertheless she is a bit erratic in her distribution of pectin among the many fruits. Some are rich in the substance, while others are deficient or totally lacking. Also there is a variation from season to season, even among the varieties of the same fruit, and during different stages of maturity.

In the preparation of fruit juice by boiling the pulped fruit with water, a certain portion of this pectin content passes from the fruit tissue into the juice. If properly handled, it causes the fruit juice-sugar solution to "jell" or "set." If handled differently it may be totally destroyed.

Pectin Supplies Structure

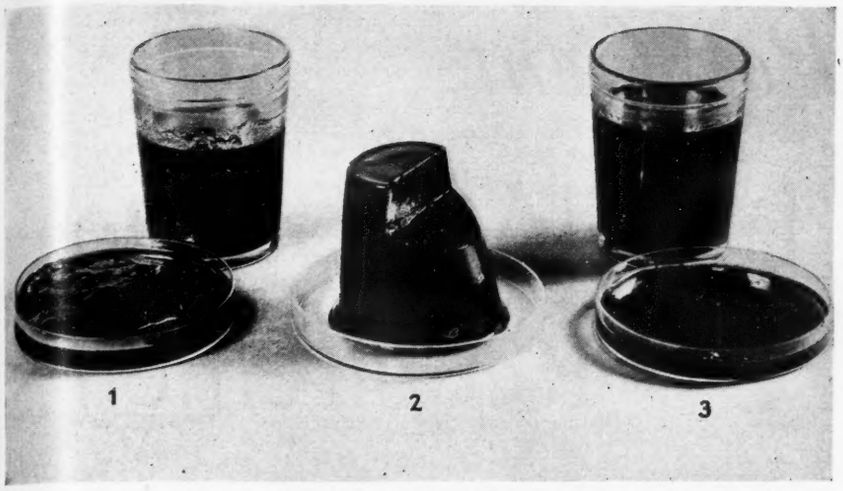
When the jelly "sets," the pectin solidifies as a framework to retain the shape of the jelly when it is turned from its container. Too much pectin results in a stiff jelly which is hard to spread and which fails to quiver as an ideal jelly should. Too little of this ingredient gives only a soft mass which is incapable of supporting its own weight.

The action of pectin in jelling fruit juices is greatly assisted by the presence of a relatively small amount of acid supplied entirely by the fruit or augmented by the addition of such fruit acids as citric, tartaric or malic. The fruit flavor of the jelly is emphasized by a reasonable tartness, consequently the acid serves the twofold purpose: to assist jellifying and to improve the flavor. Fruits exhibit a marked variation in acidity as well as in pectin content. Those rich in both constituents have long been recognized as easy to jell.

Somewhat similar to the function of acid, sugar serves the dual purpose of enhancing the fruit flavor and assisting the pectin to jell. It has been found through experience that a sugar concentration of about 65 per cent and a small amount of acid are prerequisites for a pectin jelly having the most desirable characteristics. A higher sugar content tends to give sticky, rubbery jelly, while less sugar produces weak jellies that tend to "weep." In practice the greater part of the sugar is added in the form of refined sugars or syrups, although a small amount is contributed by the juice.

Fruit juice may always be counted upon to have enough, if not too much, water for good jelly formation. Its function is to dissolve the pectin, sugar and acid and to distribute the flavor.

We should bear in mind that from the practical viewpoint the four substances, pectin, acid, sugar and water, should be combined within well defined but not too narrow concentration limits. Aside from the effect of jelly firmness, improper combination can result in too quick of a "set." Successful jelly making depends upon the jelly setting after it has been cooked and poured into the final container. If jellification begins before that time, subsequent handling



Nos. 1 and 3 illustrate the result of attempts to make cranberry jelly with juice containing the natural quick-setting pectin. No. 2, Cranberry jelly made by replacing the natural pectin with the prepared slow-setting kind has the desired quiver, retains its shape when emptied from the glass, and spreads easily.

will disrupt the continuous jelly structure and give a salve-like mixture of individual jelly pieces.[3]

Premature gelation can be brought about by the presence of too much pectin, acid or sugar, or all three. In addition, other factors being the same, pectins have been found to differ widely in their jelly-setting rate. The natural pectin from fruits, extracted from the pulpy parts by boiling with water, has been observed to exhibit a marked tendency to congeal the batch quickly. Science has aided the preserver, by making possible the preparation of pectins with a slower setting rate. By their use jellies may be processed and packaged before the "set" takes place.

Because of the unequal distribution of either acid or pectin, or both, the problem with most fruits is to secure adequate firmness in the final jelly. In the case of cranberries a different situation exists. They have more than enough pectin and acid available to form a firm jelly.

In the production of cranberry sauce, trouble can be prevented by stopping the boiling process upon reaching a sugar concentration somewhat below 60 per cent. There the tendency to jell is less and the jelly can be packaged before gelation starts. As previously pointed out, the result is a product which is very acceptable when eaten with meat but one which is not truly a table jelly such as we have grown accustomed to expect.

After witnessing the futile attempts of one preserver to prepare a cranberry jelly of good spreading qualities and an attractive "quiver," research was undertaken with the following results.[4]

It was found that if the large amount of naturally occurring, rather quick-setting pectin of the cranberry juice was replaced by the exact amount of slow-setting pectin required to jell the batch, the problem was solved. It seems paradoxical to destroy the pectin which Nature has so kindly supplied, but further reflection will show that it is thoroughly practical and worth while.

Nature has her own way of destroying pectins in fruits, thereby softening the fruits as they mature. Anyone who has attempted to make jelly from overripe fruit has become aware of that fact. In recent years the natural pectin-destroying substances, enzymes, have been isolated and used to the preservers' advantage. The one specifically attacking pectin is known as pectinase, available in commercial form under the name of Pectinol [5, 6, 7]. It performs its destructive work best at about 100 deg. F. and is itself destroyed at the boiling point of water.

To prepare the cranberries for jelly making in accordance with the new process, the washed berries are boiled with sufficient water until thoroughly pulped. This part of the process usually requires a few minutes. The pulp is cooled to approximately 100 deg. F. and enough pectinase solution is added to decompose the pectin completely in a few hours. The rapidity of the action depends on the strength of the enzyme preparation, the amount of the pectin, the acidity of the juice, and the temperature. By again heating to boiling, the activity of the enzyme is destroyed and the pulp can be removed by straining. In the absence of pectin it is quite possible to secure an excellent yield of clear, sparkling juice by simple straining. If a pulpy jelly is desired, only the skins need be removed.

To jellify each 100 lb. of juice, 1 lb. of 100 grade slow-setting pectin and 100 lb. of sugar are required. The pectin is mixed with about 10 lb. of sugar to prevent its lumping when stirred into the warm juice. After adding the pectin-sugar mixture and heating to boiling, the remaining 90 lb. of sugar is added. The batch is heated to boiling and evaporation is allowed to proceed until a concentration of 65 per cent solids is reached. The end point can be determined, as with any fruit jelly, by a "sheet test," with a refractometer or with a thermometer. Packaging is carried out in any convenient manner, there being ample time before jellification.

Pulp May Be Removed

Opinion seems to be divided as to the desirability of pulp in the jelly. Some appreciate the lessened astringency of the clear jelly; others prefer the more pronounced flavor of the pulpy product. The process is sufficiently flexible to satisfy either demand. In addition, the product possesses one virtue which cranberry sauce lacks—it can be eaten as a fruit jelly and need not be associated with the meat at the holiday table, although it will be found quite acceptable there. The effect of the enzyme treatment on the color and flavor of the juice, if any, is too small to be detected in the jelly.

While this discussion has been confined to cranberries, the process of enzymatically removing the excessive quantity of natural quick-setting pectin from fruit juices can be applied to other fruits where a similar difficulty is encountered.

REFERENCES

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(2) Joseph, *Western Canner and Packer*, November (1930).

(3) Cole, Cox and Joseph, FOOD INDUSTRIES, Vol. 2, pp. 219-221 (1930).

(4) The described process forms the basis of an application for a patent by California Fruit Growers' Exchange, manufacturers of the prepared slow-setting pectin.

(5) N. Y. State Agricultural Experiment Station, Technical Bulletin No. 178 (1931).

(6) Davison, and Willaman, *Botanical Gazette*, Vol. 83, pp. 329-361 (1927).

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Saving 75 Per Cent

In Floor Space Requirements

By D. B. GOLDBERG
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Closed-plate type heat exchanger permits doubling of production capacity as well as pasteurizes and cools milk in one-fourth floor area used by other pasteurizing and cooling systems.

THE ABOLITION of loose milk for retail sale in New York City on June 1 put a heavy demand upon Grade B milk bottling plants, which in some cases called for an increase in production capacity. For plants situated in a closely built-up section of the city such an expansion sometimes meant the facing of a floor-space shortage, a high tax or rent expense, and an inadequate supply of low-cost water for cooling purposes. In other cases an expansion offered an opportunity for better utilization of available floor space, for a spreading of overhead expense, and a more effective use of existing equipment.

In the modernization program which had been started about two years ago, steps had been taken to put the plant of the Honeybrook Farms, Inc., on a flexible-production low-cost basis. The greatest problem had been to get adequate pasteurization and cooling capacity in a minimum floor-space area and with the use of as little water as possible. To this end a closed-plate type heat exchanger had been installed to handle the milk in a continuous manner from the time it was delivered from glass-lined tank trucks into a 2,000-gal. stainless-steel-lined storage tank until it was bottled and capped ready for the wholesale trade.

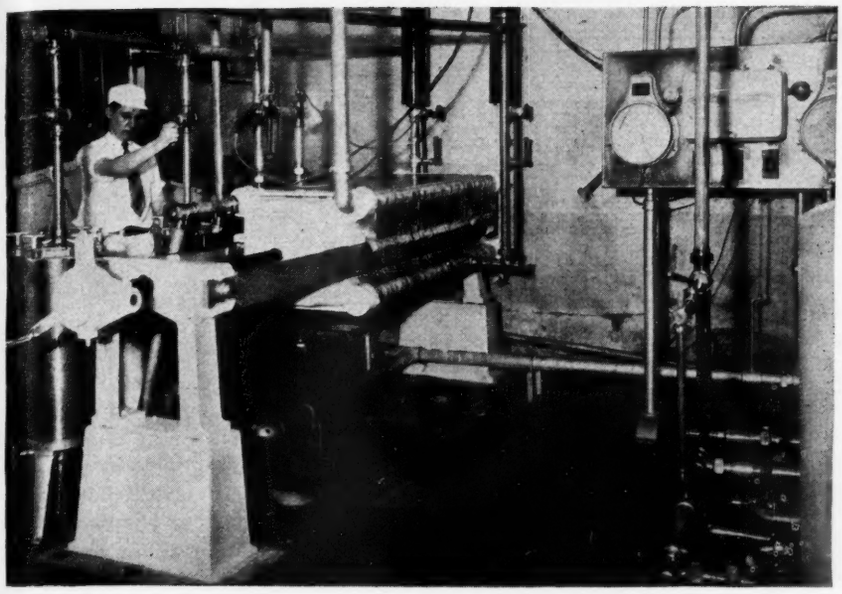
With such a unit it was possible to receive and pasteurize 25,000 quarts of milk daily in a floor space of 24x 36 ft. This was possible because the heat exchanger, which served both to heat the incoming milk to pasteurization temperature and to cool the outgoing milk to bottling temperature, occupied about one-fourth the space that would be required if we had used another pasteurizing and cooling system.

The equipment necessary to handle the 25,000 quarts of milk daily in the 864 sq.ft. of floor space consisted of a 2,000-gal. Cherry-Burrell stainless-steel-lined receiving storage tank, a 33-plate York heat exchanger, a 6,000-lb. per hr. York vertical tubular filter, four York stainless-steel-lined pasteurizing holding vats each having a capacity of 200 gal. and equipped with cyclone type agitators driven by ¼-hp. motors and a 300-gal. tinned copper surge tank which serves to assure a continuous and uniform flow of milk to the bottling machines. In addition to the processing equipment this floor area provided for a small set of coils for occasional precooling of milk as it is delivered to the receiving storage from the tank trucks and for a metal rectangular vat in which the 1½-in. sanitary piping and fittings are washed and dried following each run of milk through the plant.

With this start, the doubling of our plant capacity involved the addition of only 27 plates to the heat exchanger. But to assure a sufficient milk supply and pasteurizer holding-vat capacity a York horizontal stainless-steel storage tank, 3,000 gal. capacity, and two York vertical stainless-steel-lined holding vats, 200 gal. each, were added to the equipment in the pasteurization room. Incidental to this increase in capacity was the installation of another 6,000-lb. per hr. vertical tubular filter to assure rapid, safe filtration and of 2-in. sanitary piping in place of the 1½-in. pipe to speed up the transfer of milk through the system.

As the rotary pumps which forced the hot milk from the pasteurizer vats to the cooling plates of the exchanger were not large enough to give satisfactory service a 25,000-lb. per hr. Cherry-Burrell positive piston type pump was installed. Westco rotary pumps capable of handling 20,000 lb. per hr. were retained to pump the raw milk to and from the receiving storage tanks.

Because we wished to provide for the installation of additional pasteurizer holding vats as the demand upon our plant capacity justified and because we wished to keep the floor area in the middle of our pasteurizing room free from equipment and give us more space for moving about, we removed the receiving storage tank from the processing room. It and the new tank were installed in a small adjacent room in the plant which was made a part of the processing room by cutting through the brick wall that separated the two rooms. This room added about 250 sq.ft. to our productive floor space. However, this addition to our processing room was not vitally essential. We could have found room for the



Only 6 sq.ft. of additional floor space was required to double the pasteurizing and cooling capacity of the York plate-type heat exchanger in the Brooklyn plant of Honeybrook Farms, Inc.

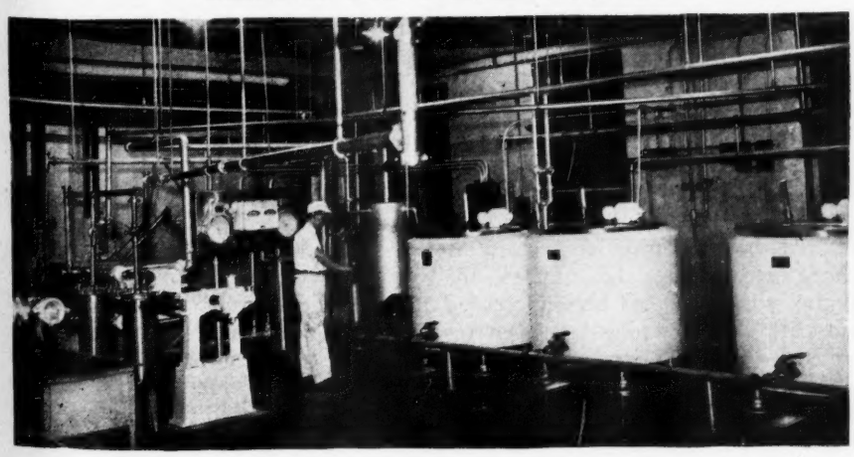
two storage tanks in the original 24x-36-ft. room if we had not wanted to provide for further expansion in production capacity and also have all of our pasteurizing equipment placed in a definite arrangement along the walls with floor drainage to the center of the room.

As the carrying out of our plans for modernization and expansion in production capacity centered around the flexibility in performance and the high production rate of the heat exchanger, it is well that a more complete description be given of this unit and its operation.

It comprises a number of stainless steel or tinned copper plates separated by thin sheets of stainless steel or tinned copper. A series of baffles in each plate forms, in effect, a continuous tube when covered by the dividing plate. This "tube" directs the flow of the milk back and forth across the plate as it passes from the inlet to the outlet at the corner diagonally opposite. Each plate has two sets of baffles, one on either side. This permits the heating or cooling medium to flow over one side of the plate and the milk over the other, thus effecting rapid heat exchange with a continuous flow of liquids, and makes the unit well adapted to regenerative pasteurization.

The cycle of milk through the exchanger may be described as follows: The raw milk at 40 deg. F. (by adding or subtracting plates other raw milk temperatures can be accommodated) goes to the middle section of the exchanger to meet hot milk (144 deg. F.) coming from the pasteurizer holding vats. Through the interchange of heat the temperature of the incoming milk is raised to 119 deg. F. and the hot milk is cooled to 65 deg. F. At the temperature of 119 deg. the raw milk leaves the exchanger to pass through the vertical tubular filters before it is returned to the "hot" side of the exchanger, where it meets water heated to 146 deg. F. This raises the temperature of the milk to 144 deg. F., at which temperature it is pumped to the pasteurizer holding vats and held for 30 min. before it is pumped back through the middle section of the exchanger to meet the incoming cold raw milk. Cooled to 65 deg. F., the pasteurized milk flows to the "cold" side of the exchanger, where it meets brine at 20 deg. F. and is again cooled to 40 deg. F. before being pumped to the surge tank ready for bottling. Each section is thermostatically controlled by the Bristol control board for regulating temperatures, and the temperature of the milk going to and coming from the pasteurizer holding vats is registered by Bristol recorders.

Milk heated from 40 to 144 deg. F. in the plate heat exchanger is held for 30 min. in stainless-steel lined holding vats before being returned to the exchanger for cooling to bottling temperature.

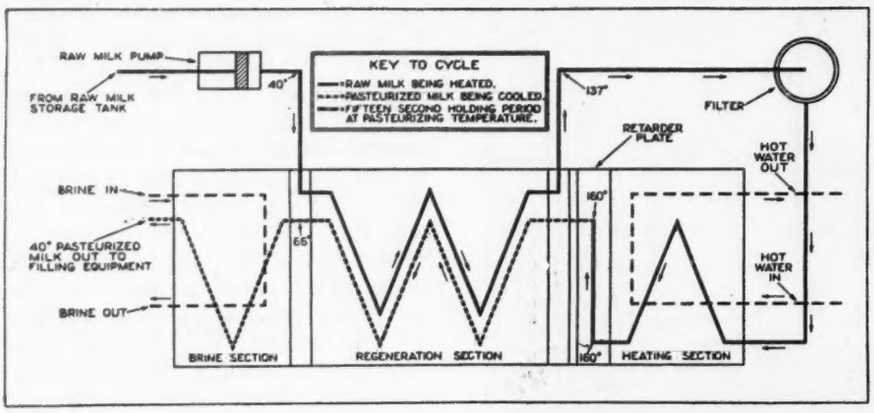


Low Bacteria Count

The effectiveness of this exchanger as a pasteurizer is evidenced by the decrease in bacteria count per c.c. of milk. Plating tests made by an impartial biological laboratory revealed that raw milk coming from the storage tank with a count of 1,020,-000 per c.c. had a count of only 38,400 per c.c. when it left the exchanger at 144 deg. F. After being held 30 min. at 144 deg. in the holding vats the count was further reduced to 5,900 per c.c., which is nearly 44,000 per c.c. below the legal maximum for Grade B milk in New York City.

The flexibility of this exchanger is best understood when one understands that we increased the capacity of our plant to 50,000 quarts by adding the 27 plates to this exchanger with an additional floor space requirement of only 6 sq.ft. without holding up production operations, and with the addition of very little other equipment. Additional capacity can be obtained by the addition of other plates with a corresponding low increase in floor space needed.

As long as the city Board of Health requires milk to he held at 144 deg. F. for 30 min., pasteurizer holding vat capacity will be an essential factor also. In localities where short-time high-temperature pasteur-



In the short-time high-temperature plate heat exchanger of the York Ice Machinery Corp. milk follows the above indicated cycle during pasteurization and cooling. When this unit is used for pasteurizing at 144 deg. F. the milk goes to the filter at 119 deg. F. instead of at 137 deg. F. and passes from the heating section at 144 deg. F. to the holding vats instead of being held for 15 sec. in retarder plate at 160 deg. F.

ization is permitted this heat-exchanger unit is reported to be highly effective. When used in that manner the raw milk leaves the middle section at 137 deg. F. to go through the tubular filter before going to the "hot" side to be heated to 160 deg. F. and held for 15 sec. It then passes directly to the middle section at 16 deg. F. and meets the 40-deg. F. incoming milk which is heated to 137 deg. F. as the pasteurized milk is cooled to 65 deg. F. In the "cold" side of the exchanger the action is the same as in the 144-deg. pasteurization.

If and when the New York City Board of Health permits high temperature pasteurization we are in a position to avail ourselves of that advantage by merely adding the retarder plate to our exchange heater and at the same time utilize our present pasteurizer holding vats as raw milk storage. Until there is more evidence than is apparent at present that such a step is likely, we have the advantages that this unit gives in that no large quantity of cold water is needed for cooling the milk and that only about one-fourth as much floor space is required to accommodate the pasteurizer-cooling system as would be necessary with other pasteurizing and cooling systems. Also we can pasteurize and cool up to 12,000 lb. of milk per hour as easily and effectively as we can the 6,000 lb. per hour of our original capacity.

$39,000 a Year Saved on Coal And Electricity

(Concluded from page 345)

none had been before. The result was the elimination of practically all escaping steam and the stream of hot water flowing to the sewer was reduced to a negligible quantity, which contributed materially to the savings made in the cost of steam.

Compressed-Air Units

Compressed air is necessary for the operation of some of the automatic machines. It was necessary to provide a larger supply than was available from the smaller units. A steam-driven air compressor was put in, large enough to take over the work of all the smaller units as well as provide sufficient capacity for these machines, and provide also for future increase in the air requirements. Some of the electrical load was thus transferred from the motor-generator set directly to the boiler house, giving us greater efficiency and relieving that part of our equipment where relief was most needed. This new air compressor was started July 7, 1930, and has been giving complete satisfaction ever since.

The cold-storage plant had been installed for over ten years and many of the pipes and pipe valves needed to be replaced. Two belt-driven York ammonia compressors were operated by two 25-hp. a.c. motors. The compressors had never been rebored and one was carrying the greater part of the refrigerating load.

For the renovation of this department a plan of repair work extending over several years was outlined. To date one of the compressors has been rebored, both motors have been replaced with 30-hp. d.c. motors, the compressor speed has been increased and part of the piping has been replaced. A steam-driven pump, already on the premises, has been installed for circulating the brine, and is being used in place of two small centrifugal motor-driven pumps which were not in good condition, but were left in place for emergency use.

The policy in this work is again to relieve the electrical load and transfer it to the boilers, also to standardize on direct current wherever possible.

Summary

The various steps which led to this spectacular economy may be summarized in two words: waste elimination.

Steam losses were stopped.

Hot-water wastes were eliminated.

An inefficient boiler was taken out of service. New boilers and higher pressure steam were utilized.

Better coal was purchased.

Steam at higher pressure was put to work before it was used in processing.

An uneconomic power purchase was eliminated.

Unused engines were put back to work.

Electric current was standardized as far as practicable.

A motor-generator set was installed so that one type of current could be converted to the other whenever the need arose.

How to Prevent Vinegar Gnat Infestation of Tomatoes

BY C. H. BLOEDORN
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EARLY in 1933, seizures of canned tomatoes were made by federal food authorities on account of the presence of the larvae of the vinegar gnat or vinegar fly (*Drosophila melanogaster*) in the canned product. During the winter packing season in the South, where this trouble was first encountered, a study was made to determine what measures were satisfactory for the control of the gnat and the elimination of contamination with its larvae. Recently similar infestation has been observed in states farther north and the seizure of recently canned tomatoes has been definitely reported. We are, therefore, taking this means of presenting such information relative to the vinegar gnat infestation of tomatoes and means of its control as were developed from our investigation.

The vinegar fly or vinegar gnat is a very small winged insect which is generally found around fermenting material. It is particularly noticeable around cider mills, vinegar factories, and at other places where fruit which has started to ferment is stored. On account of its small size, it is impossible to protect fruit or other material from the gnat by screening. It deposits its eggs in fruit only where the skin is broken and, according to information given in the literature, will not deposit its eggs unless a slight fermentation, generally caused by yeast, has already started. When the eggs hatch, the larvae penetrate below the surface of the fruit, such as tomatoes, and may contaminate the interior, although this contamination is usually but a short distance below the surface.

Ordinary methods of peeling and trimming tomatoes for canning may not entirely eliminate the larvae of the vinegar gnat if they are present. The larvae themselves are very small and will not be noticed except on very careful examination. They very seldom exceed $\frac{1}{16}$ in. in length; are usually white, but frequently slightly pinkish in color; and have a segmented body with a speck of black at the head end. It is rather difficult, except on very close examination, to distinguish them from the small, white undeveloped sprout which occurs in tomato seeds.

Infestation of the tomatoes with the larvae may occur in the fields or may occur at the unloading platform at the factory. The latter is particularly true if tomatoes are allowed to stand on the unloading platform before being canned. Infestation with the larvae will not occur unless the skin is broken. Such conditions characterize tomatoes which are cracked, bruised or decayed in spots.

Our experimental work has shown that canned tomatoes which meet all the requirements of the Federal Food and Drug Act can be packed in districts where the gnats are prevalent, but, to do so, more than ordinary care must be exercised. In plants where there has been a tendency to become somewhat lax with respect to the quality of tomatoes accepted, it is essential that a radical change be made in the standard for quality of tomatoes acceptable for canning.

THE FOLLOWING PROCEDURES were found suitable for removal of infested tomatoes and elimination of the infested points on fruit which was passing through the factory:

1—**Elimination in the field** of cracked, decayed, or bruised tomatoes to as great an extent as possible. *Such tomatoes should not be brought to the factory* and should not be accepted if they are delivered. Growers should keep fields reasonably free from decaying tomatoes, which are the normal breeding places of the gnats and their principal source.

2—**Tomatoes brought to the factory** should be stored for as short a time as possible on the loading platform. When boxes of tomatoes stand for some time the weight of the tomatoes above crushes to some extent the tomatoes in the lower portion of the boxes and such tomatoes are likely to become infested with the larvae of the vinegar gnat.

3—**Careful inspection of tomatoes before peeling** so as to remove tomatoes with broken skins or decayed portions.

4—**Thorough washing of the tomatoes before peeling.** A spray washer is most satisfactory for the purpose, as the pressure of the water tends to wash out the portions of tomatoes where infestation with larvæ is most likely to occur. There should be good distribution of the water, and this should hit the tomatoes with sufficient force to break out and wash away any soft spot. *Use force rather than volume of water.* A less vigorous spray wash on the tomatoes after they pass through the scalder is also of assistance in removing infested portions.

5—**Careful inspection of tomatoes by the peelers** in order to remove any tomatoes of a suspicious character which have reached this point of the operation. Peeling the tomatoes into pans containing unpeeled stock is inadvisable, as peeled tomatoes may become contaminated with larvæ which have been removed during the peeling of other tomatoes.

6—**Prompt disposal of waste material** resulting from peeling, trimming, and sorting. Allowing this material to remain around the factory attracts the vinegar gnat and increases the possibility of tomatoes on the unloading platform being infested.

7—**Careful coding of cans** so as to be able to segregate any lot in which infested cans may be found. Each day's pack should be coded separately and, where practicable, it is best to divide the day's output into batches and code each batch separately. If closing machine does not have a marking device, ordinary rubber type and can-marking ink can be used.

8—**Examination of the canned product** from time to time to determine whether the larvæ of the vinegar gnat are present.

The examination may be carried out by taking cans before they are closed and pouring the contents of the can on a wire screen. 8 to 12 in. in diameter, having meshes about $\frac{1}{8}$ in. apart, and the screen being held over a pail of 10 to 14 quarts capacity. The tomatoes are then forced through the screen by rubbing and stirring with the fingers until only the core and skin, if any, remain. A stream of water may be directed on the screen to aid. The bucket is then filled with water, and after a minute or two is allowed for the solids to settle, the water and floating portions of the can contents are slowly poured off until only about one quart of liquid and settlings remains. The bucket is then filled about one-quarter full and the procedure repeated until only about one pint of liquid remains. The final liquid and settlings are then poured into a shallow black pan (a rubber photograph-developing tray is excellent) for maggot examination. The maggots may be identified by the characteristic segmented body, slightly pink color, a speck of black at the head end, and the absence of the fuzzy outside appearance so common to tomato seed sprouts which are sometimes mistaken for maggots. A hand lens or reading glass is useful.

WHILE the above information may have no application in some sections, it will be found of value to canners in localities where infestation with larvae of the vinegar gnat is possible.

A critical examination of tomatoes may disclose contamination with larvae other than of the vinegar gnat. Tomatoes raised in sections where potatoes are grown extensively may become infested with larvae of the potato tuber moth. Other contamination has also been reported.

NOTE: In the more northern states, the vinegar gnat is perhaps more widely known by the name "fruit fly," rather common in apple and pear orchards where drops are permitted to remain on the ground. We prefer, however, to use the name vinegar gnat so as to avoid confusion with the more properly named fruit fly so destructive to citrus fruits.

The "GOOD" *is in the* BREWING

. . . Would you try to protect the quality of your product against consumer abuse if you could? . . . The coffee roaster can

By P. W. PUNNETT

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Columbia University
New York, N. Y.

In the August issue of *Food Industries* Dr. Punnett showed that there is no standardization in the grinds of coffee on the market today. Also that standardization is desirable both to the consumer and to the roaster. In calling attention to the advantages of a "universal" grind he described it as one sutable for making "good coffee" in all types of coffee making appliances. In this article Dr. Punnett submits data to prove the practicability of a "universal" grind.—EDITOR

THE SUREST way to prove the value of an idea is to submit it to practical tests involving the equipment and conditions which are factors in putting the idea into practice. It is our conviction that a "universal" grind of coffee will have about 15 per cent tailings when sifted in a rotary screen sifter such as was described at the end of page 292, August, 1933, issue of FOOD INDUSTRIES. Also that a coffee with such a grind is desirable for the majority of coffee making appliances offered to the consumer today.

We may learn from a study of the two principal types of devices for brewing coffee—the percolator and the drip pot—that the compartments for holding the ground coffee are much alike in design. Consequently, the greatest trouble to be feared when using a relatively fine coffee is cloudiness of the beverage. However, the tests showed that the beverage is actually clearer with a comparatively fine ground coffee than with a coarser grind.

For test purposes, a group of coffee-making devices were selected from the average offered to the consumer. These devices were of both the drip and percolator types and of a wide price range—it might be said at this time that purchase price has little to do with the efficiency of the device. Through the courtesy of a large coffee roaster four grinds of coffee were obtained. All of this coffee was from the same roast and was packed in vacuum to maintain freshness until used in the tests. The coarsest grind gave 46.3 per cent tailings on the rotary grind tester, or a grind that was equivalent to the majority of the so-called "steel cut" grinds. The next coarsest grind gave 34.5 per cent tailings and the third grind left 25 per cent tailings. The last and finest of the grinds gave 16 per cent tailings, and was selected as the ideal, or "universal," grind as a result of the work described in the August issue of FOOD INDUSTRIES.

It is accepted that all coffee-making devices operate best when used at maximum capacity; for that reason each device used in this test was so operated. Water at 212 deg. F., or boiling, was used in the drip pots, while water at 68 to 70 deg. F. was used in the percolators. There were few exceptions to this rule in the case of the drip pots where an electric heating element was a part of the

coffee maker. The time required for the brewing of the beverage in the drip pot was governed, of course, by the pots, but each percolator was operated for ten minutes after the water coming through the tube began to show discoloration or was yellow. This time period was determined by previous work that had shown that in ten minutes the average percolator produced a brew of good strength without boiling. Of course, valveless type percolators do not start to function until the water has practically reached the boiling point. However, seven to ten minutes is required to obtain good extraction.

Before starting these tests it was necessary to determine some method by which the clarity of the beverage could be rated. Many methods were considered; the most exact and practical method was that which is described as follows:

A brew of coffee was filtered several times until it was free from solid particles. This brew was then measured in 15 c.c. quantities into test tubes. The purpose of using the coffee brew was merely to give color. Into each test tube finely powdered coffee was placed in quantities varying from 2½ milligrams up to 40 milligrams. As the average serving cup will hold about 150 c.c. of beverage each test tube contained one-tenth of a serving cup. Sodium benzoate was placed in each test tube as a preservative. The powdered coffee settled to the bottom of the tubes and was easily visible for comparison with 15-c.c. samples taken of each brew made during the test. The samples of the test brews, containing sodium benzoate as preservative, were allowed to stand for twenty-four hours before being compared with the standard clarity test tubes.

Brewing Time Important

The total time required for each brew made in a drip pot was carefully recorded, as was the time required for a percolator to start operating and for the percolations to begin to discolor. Of course, the total time of operation for each percolator was from the time heat was applied until discoloration plus ten minutes. The water was measured with an eight-ounce standard measuring cup and the coffee was weighed in grams in the proportions of 12 grams to each 8 ounces of water. As each brew was made it was measured to determine the amount of liquid retained by the coffee. In nearly all

Table I—Type of Coffee Brewing Devices Used in Tests and Their Operating Characteristics

Device Number	Type of Coffee Brewing Device	Maximum Capacity In Pints	Grams of Coffee Used	Time to Brew	Min.	Sec.	Amount of Beverage Produced in Pints
1	Drip	2	48	.....	7	30	1.75
2	Drip	3.5	84	.....	7	30	3
3	Steeper	2	48	Steeping	11	00	1.75
				Drainage	18	00	
4	Percolator	2.5	60	1st percolation	1	20	2.313
				Discolor	4	10	
				End	14	10	
5	Drip	2.75	66	.....	7	00	2.375
6	Percolator	2	48	1st percolation	5	30	1.75
				Discolor	6	30	
				End	16	30	
7	Drip	3	72	.....	10	30	2.63
8	Drip	2.5	60	.....	10	30	2.188
9	Percolator	2	48	1st percolation	1	00	1.75
				Discolor	4	00	
				End	14	00	
10	Percolator	2.5	60	1st percolation	10	30	2.188
				Discolor	11	00	
				End	22	45	
11	Percolator	2	48	1st percolation	1	30	1.83
				Discolor	3	00	
				End	13	00	
12	Percolator	2.5	60	1st percolation	1	30	2.25
				Discolor	3	00	
				End	13	00	
13	Drip	3	72	.....	8	30	2.563
14	Drip	3	72	.....	9	15	2.5
15	Drip	3	72	.....	6	45	2.69
16	Drip	3	72	.....	9	15	2.63
17	Drip (Special)	2.5	60	.....	26	30	2.38
18	Drip (Special)	2.75	66	.....	34	00	2.188
19	Drip	3	72	.....	21	00	2.38
20	Percolator	2.5	60	1st percolation	1	50	2.25
				Discolor	8	00	
				End	18	00	
21	Drip	2.5	60	.....	10	30	2.25
22	Percolator	3	72	1st percolation	19	30	2.75
				Discolor	21	00	
				End	31	00	
23	Drip	2.5	60	.....	6	30	2.25
24	Percolator	2	48	1st percolation	0	45	1.813
				Discolor	2	00	
				End	10	15	
25	Drip	2.5	60	.....	11	00	2.75
26	Drip	3.5	84	.....	20	30	3
27	Percolator	2.75	66	1st percolation	1	00	2.5
				Discolor	3	30	
				End	13	30	
28	Drip	1.75	42	.....	8	00	1.5
29	Percolator	1.5	36	1st percolation	17	00	1.33
				Discolor	17	30	
				End	27	30	
30	Drip	1.5	36	.....	2	30	1.33
31	Percolator	3	72	1st percolation	6	00	2.83
				Discolor	7	30	
				End	17	30	
32	Percolator	3.25	78	1st percolation	1	10	3
				Discolor	11	00	
				End	21	00	
33	Percolator	3	72	1st percolation	2	00	2.66
				Discolor	4	15	
				End	14	15	
34	Percolator	1.5	36	1st percolation	10	30	1.0
				Discolor	11	00	
				End	21	00	
35	Percolator	2.5	60	1st percolation	14	15	2.25
				Discolor	15	15	
				End	21	00	
36	Percolator	3	72	1st percolation	11	15	2.68
				Discolor	12	00	
				End	22	00	
37	Percolator	3.5	84	1st percolation	10	30	3
				Discolor	11	30	
				End	21	30	
38	Percolator	2	48	1st percolation	8	00	1.68
				Discolor	8	30	
				End	18	30	
39	Drip	2	48	.....	12	00	1.75
40	Percolator	2.25	54	1st percolation	21	00	1.83
				Discolor	21	30	
				End	31	30	
41	Percolator	3	72	1st percolation	3	00	2.83
				Discolor	10	00	
				End	20	00	
42	Percolator	2.5	60	1st percolation	6	00	2.16
				Discolor	16	00	
				End	26	00	

cases this was about 10 to 15 per cent of the liquid used.

The strength of the brews was determined by the standard cup test. This method consists of steeping 8 grams of coffee in 150 c.c. of hot water as a 100 per cent brew and making brews of other strengths by varying the amounts of coffee used in 10 per cent steps. The brews under test are then compared with the standard brews by tasting one against the other. This method is an adaptation of that described in the article by Punnett and Eddy, "What Flavor Measurement Reveals About Keeping Coffee," in FOOD INDUSTRIES, September, 1930, pp. 401-404.

One thing, which may puzzle the reader at first glance, might be explained here. In the tables of the results of the tests, one may notice occasionally in the case of drip pots a cup strength of 105, 110 or 115 per cent. This is understandable when one realizezs that the liquid held by the grounds is—or should be—almost all water. Hence, if extraction is complete, all of the flavor is contained in 85 to 90 per cent of the water used and the cup strength will be above 100 per cent. In the case of percolators, all of the flavor will be distributed in *all* of the water used, since the "hold-up" in the grounds is beverage. For that reason the cup strength will never be over 100 per cent.

In the final analysis the roaster and device manufacturer are working for the consumer's needs, and he is interested in having the greatest efficiency when making his coffee brew. As the grind is a factor of the efficiency of the pot we found it necessary to determine this efficiency and did so by the following formula—

$$\text{Efficiency} = \frac{S \times V_F^S}{C/12}$$

Where S = Cup strength in percentage
V_F^S = Volume of beverage produced in standard measuring cups
C = Weight of coffee used in grams

Under Tables I, II will be found a complete record of all information collected in these tests. A careful analysis of these tables shows the following results:

1. In *general* the finest grind shown on Table II, Grind No. 4, gave as *good* and in most cases *better* clarity than the others.

2. The grinds of Nos. 2 and 4 were about the same in the average clarity, but more pots gave better clarity in Grind No. 4 than in Grind No. 2.

3. If the grind is like that of No. 4 or No. 3 the average pot will give the best efficiency—No. 4 grind in the case of the drip pots and No. 3 grind in the case of the percolators.

In other words, *grinds much finer than those generally found are entirely practical for use in the majority of the percolators and drip pots tested*—which probably are representative of all available. The first article, FOOD INDUSTRIES, August, 1933, has pointed out the advantages to the roaster and to the consumer of a grind of coffee that is finer than the great majority of those now on the market. This article points out the practicability of such a "universal" grind; one equally suitable for percolators and drip pots. Therefore, it would seem that objections to such a grind are not based on facts and that every coffee roaster will do well to join the present trend towards a "universal" grind.

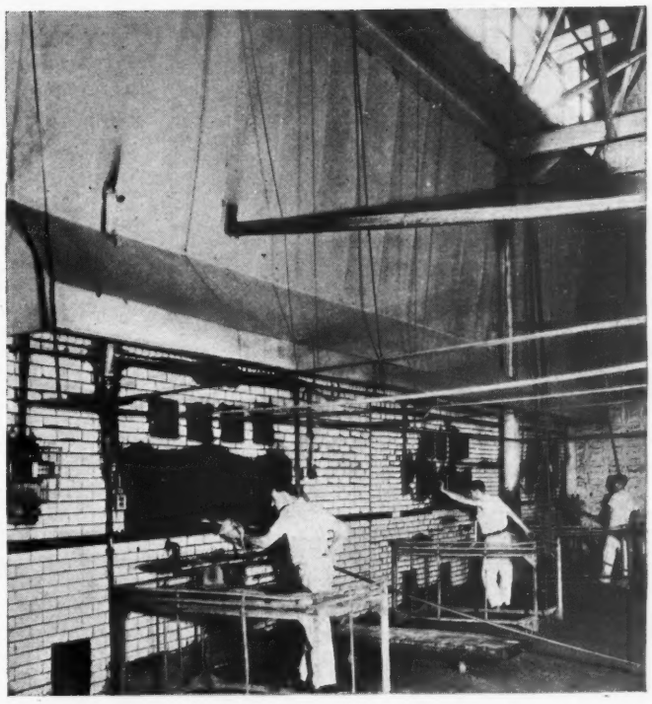
In the third article of this series, will be given the results of an examination of the structural details of the pots tested with an attempt to draw some conclusions as to the design of a satisfactory coffee pot.

Table II—Comparison of Results Obtained When Coffee-Brewing Devices Described in Table I Were Run With Each of Four Different Grinds of Coffee

Device Number	Grind No. 1 —Tailings—46.3 per Cent— Per Cent Strength by Standard Cup Test	Over-all Efficiency of Device	Clarity of Beverage	Grind No. 2 —Tailings—34.5 per Cent— Per Cent Strength by Standard Cup Test	Over-all Efficiency of Device	Clarity of Beverage	Grind No. 3 —Tailings—25.0 per Cent— Per Cent Strength by Standard Cup Test	Over-all Efficiency of Device	Clarity of Beverage	Grind No. 4 —Tailings—16.0 per Cent— Per Cent Strength by Standard Cup Test	Over-all Efficiency of Device	Clarity of Beverage
1	90	79	20	90	84	5	75	69	4	100	88	7½
2	85	73	8	70	49	1	75	64	3	100	86	8
3	70	58	3	115	100	1	75	68	1	90	79	1
4	85	76	5	90	86	2	85	79	1	75	70	3
5	85	79	8	100	89	10	75	64	10	85	74	8
6	85	74	10	80	73	2½	65	65	1	95	83	4
7	100	84	0	100	83	0	100	88	0	115	100	0
8	50	45	5	65	56	7½	75	65	1	60	52	2
9	70	61	3	80	73	7½	90	79	3	105	92	3
10	85	77	10	90	77	3	80	69	2	90	79	3
11	100	67	2	70	61	2½	90	84	2	100	85	1
12	90	81	3	75	68	2½	95	86	1	100	90	1
13	90	80	10	70	61	5	85	76	10	95	82	5
14	95	84	8	95	81	7½	75	67	8	75	63	3
15	65	58	5	80	70	3	60	55	8	75	67	4
16	85	71	10	80	68	7½	70	61	10	90	79	5
17	85	83	3	75	67	0	50	47	0	75	72	1
18	110	90	5	100	73	4	100	84	7	90	72	2
19	110	100	15	80	75	25	115	100	9	105	83	60
20	100	90	2	90	77	4	95	83	8	95	86	3
21	80	69	5	60	51	2½	85	74	4	80	72	2
22	85	79	8	80	71	1	75	67	4	70	64	1
23	85	75	15	75	70	10	80	67	6	70	63	40
24	85	80	5	80	72	2½	90	83	8	80	73	2
25	90	78	0	75	53	1	105	89	0	110	99	1
26	75	66	2	75	63	4	85	73	3	75	64	3
27	80	73	1	100	91	1	90	82	6	95	86	1
28	65	56	4	70	60	10	70	62	4	100	86	8
29	105	93	2	75	73	1	95	84	3	65	58	2
30	50	48	4	30	27	10	40	37	5	50	45	5
31	85	74	0	90	75	1	100	89	2	90	85	2
32	75	71	1	75	72	1	90	85	4	60	56	1
33	75	67	1	75	58	1	85	76	4	80	71	3
34	75	59	9	95	63	10	95	67	15	90	60	6
35	80	69	2	90	68	2½	95	82	8	70	63	3
36	70	62	1	70	54	1	95	81	3	75	67	3
37	110	84	1	90	77	2	95	78	4	110	95	4
38	80	70	2	100	75	2	95	83	2	70	59	1
39	80	70	0	80	70	0	75	66	0	100	88	1
40	75	67	1	80	71	5	85	78	1	70	51	6
41	85	80	1	70	64	1	95	87	2	90	85	5
42	90	78	3	75	64	5	70	63	3	90	78	3

One Way to VENTILATE *a Food Plant*

By OLIVER S. ARATA
St. Louis, Mo.



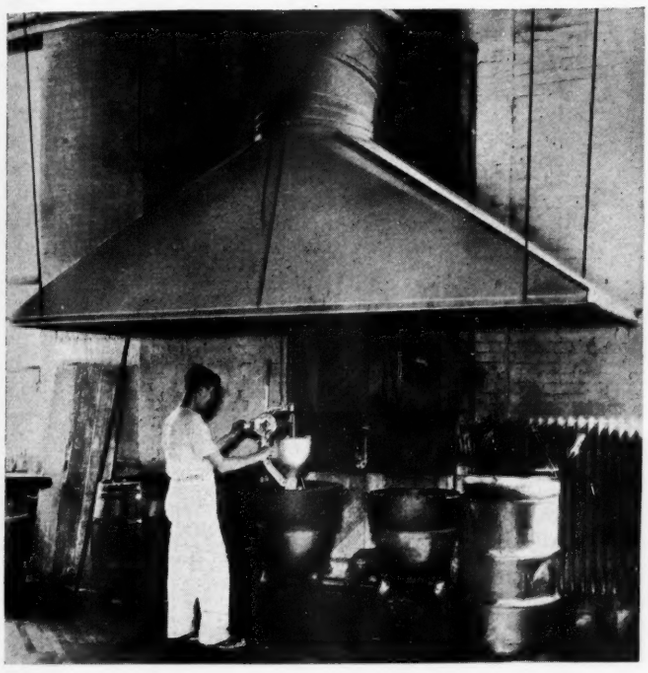


Fig. 1 (Above)—Hood across front of ovens with suction pipe opening over each oven door supplements skylight and circulating fan ventilation

Fig. 2 (Left)—Fumes and heat from doughnut-frying kettles are discharged outside building by use of hood connected with large suction fan.

SMALL food plants, particularly bakeshops equipped with brick peel ovens, ofttimes have problems in ventilation engineering that are as real as any encountered in large plants. Even though the thick brick walls of the oven hold radiated heat to a minimum, there is a considerable amount of heat, moisture-laden gases and even some smoke that escapes into the bakeshop, especially from the door through which the oven is loaded and emptied. This escape of heat and gases is objectionable both from the standpoint of comfort for the workers and of the effect upon the odor, flavor and workability of materials in storage and in process.

The effects of plant odors and vapors upon raw materials in storage and during the mixing operations have not been taken into consideration as much as the flavor and odor appeal to the consumer by the finished products justify. With the advent of doughnut and potato-chip frying, coffee roasting, and candy cooking into bakeries greater attention must be given to this phase of general plant ventilation. Publications serving the baking trade, speakers addressing bakers' conventions, and specialists in the baking trade associations are more and more emphasizing the importance of this precaution against consumer complaint of and refusal to buy bakery products.

An installation illustrating one solution of the bakeshop heat-odor fumes problem is found in the plant of Manewal Baking Co., St. Louis, Mo. The system installed in this plant by the Western Blow Pipe & Sheet Metal Co. provides for catching the heated air, the fumes, and odors at their point of origin and conducting them through ducts to the exterior of the building.

In the bakeshop a hood extends across the entire front of the battery of ovens. Over each oven door is an opening into a suction pipe which is a part of the hood construction. When the door of any oven is opened the gases and fumes escaping from the oven are drawn upward into the suction pipe and out of the shop through a flue on top of the building. As moisture-laden air is escaping from the ovens at all times during the baking operation, a drip line was installed in the hood to catch the condensate.

Prior to this installation the bakery depended upon a skylight and a circulating fan, which were inadequate as well as antiquated.

Over the open doughnut-frying kettles a large hood was so placed that the heated air currents and fumes from the hot frying fat were drawn directly up from the kettles and out through a suction pipe extending through a window in which was placed a large suction fan.

Because installations of this type are simple and relatively inexpensive they are adaptable to the smallest bakery. Each bakery, of course, presents a different problem to the ventilating engineer and almost necessitates that each installation be tailor-made to fill satisfactorily the need of the plant.

. . . FIVE WAYS TO MAKE . . .

Better "3.2" Cider

By WEAVER L. MARSTON
Sharples Specialty Co.
Philadelphia, Pa.

THE RECENT MODIFICATION of the Prohibition Act to permit the sale of "3.2" beverages opens up a tremendous potential market for American cider makers in the sale of fermented cider, and one of which advantage can best be taken before complete repeal is carried through.

In England the cider business is one of no mean proportions, the annual consumption being around 75,000,000 gallons, or about 2 gallons per capita. A similar per capita consumption in the United States would represent an annual sale of one quarter of a billion gallons of cider annually, requiring some 16 million bushels of apples—surely a sizable market, and one worth going after.

It is only natural that because of such an important market, English cider makers have done considerable research work to improve their product. The National Fruit and Cider Institute has conducted many interesting tests at the research station of the University of Bristol, Long Ashton, the results of which have been of value to the entire industry. As a result of research conducted by the institute with a super centrifuge during the fall of 1929, many of the important English cider producers have adopted the centrifugal method for clarifying cider.

It is common knowledge that cider is made from the juice of apples, the juice usually being extracted from the ground-up apples by hydraulic presses. After pressing, the juice has to be clarified to remove the pulp that comes through the press. The degree of clarity attained may vary from a very cloudy product to a brilliantly clear product for bottling.

Heretofore the legal limitation of the alcoholic content of cider in the United States has made it necessary to prevent any fermentation of the juice. The cider has had to be filtered, bottled and pasteurized immediately after pressing, the pasteurizing step being necessary to prevent fermentation and keep the product within the law.

In the making of "3.2" cider a certain amount of fermentation is required, which necessarily calls for an entirely different technique to produce the most palatable drink possible. Naturally, fermentation must be checked at a predetermined point, but any sacrifice of flavor or body, due to such control of fermentation, will be detrimental to the product. Very few English cider makers use pasteurization as a means of checking fermentation.

The tests at the National Fruit and Cider Institute were performed with a super centrifuge constructed so that all parts in contact with the juice were made of Monel metal. This same type of machine is now used by such important English companies as Henry Whiteway & Co., J. Symons & Co., Carr & Quick, Ltd., and others. Several different methods have been devised for using the equipment, depending upon results desired.

Method "A"

In this process, juice is stored immediately after pressing. As natural fermentation progresses (which has the effect of changing the natural sugar into alcohol) the specific gravity of the juice is thereby reduced. As an example, while the juice may have a specific gravity of 1.050 when made, in the course of three weeks' to a month's time, the specific gravity will become about 1.030 to 1.020. At this point the alcoholic content is desired to be slightly lower than that ultimately desired in the finished product.

As a rough check in determining the alcoholic content, a nine-point drop in the specific gravity is equal to approximately 1 per cent of alcohol by volume. Thus a perfectly sweet apple juice, with a specific gravity of 1.050, should be allowed to ferment until the specific gravity falls to 1.014 to obtain a 4 per cent alcoholic content by volume.

The juice is then centrifuged to remove the yeast and the "yeast food," which checks the fermentation to the extent that, after centrifuging, the specific gravity diminishes only about one-half to one point a month. This ability of the super centrifuge to check the fermentation is very important and is of real value to the cider maker.

After a further three-months' storage the cider is again centrifuged, then "polished" by putting through a pulp filter, carbonated and bottled. This process produces a brilliantly clear cider, naturally sweet and of the desired alcoholic strength.

Method "B"

Another process is to allow fermentation to continue naturally until it is practically completed, resulting, of course, in a "dry" cider. It is then centrifuged and sugar syrup is added to give the desired sweetness, after which the juice is filtered, carbonated and bottled.

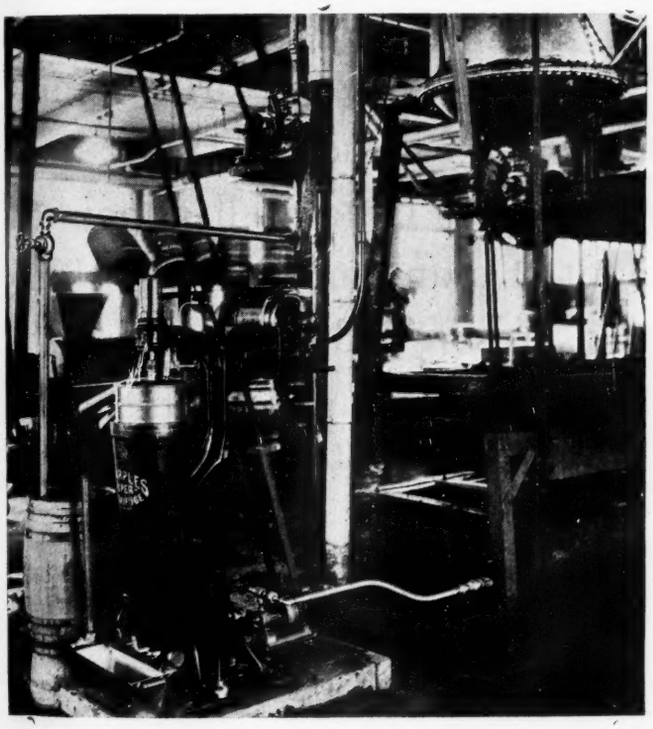
Cider produced in this way will naturally have alcoholic content higher than now permitted in the United States, or as described under Method "A." It may be reduced to the proper content, however, by dilution with pure water or sugar solution. The method eliminates the storage necessary for naturally sweet ciders, and as a result permits the

sale of cider within two or three months after making.

This process is employed by one large English company which recently has been shipping large quantities of cider to the United States. This concern uses five super centrifuges. It is believed that this process will meet with the most favor in the United States, particularly because it allows the makers to put a high-grade fermented cider on the market quickly.

Method "C"

Still another method is to centrifuge the juice about one month after making and to store it until the whole of the season's output has been pressed, which covers a period of several months. The juice is then re-



The high-speed centrifuge is an important tool of food processing. It can be operated to remove not only turbidity from liquids but also yeast and bacterial cells, and produce practical sterility.

centrifuged, and the resultant product is bottled without either filtration or carbonating, and is stored in bottles for 18 months to 2 years. At the end of this period, the cider is sold as "naturally conditioned" cider, and commands a much higher price, since it is perfectly brilliant and has a natural effervescence.

Method "D"

In England a very large quantity of so-called "draught cider" is consumed due to its cheapness. This type is distributed in bulk, but is not carbonated. Brilliance is not required, and, in fact, excessive clarity tends to spoil it for its particular market. Centrifuging will produce this type of cider very satisfactorily without further processing. The cider is centrifuged when the specific gravity has fallen to the point which corresponds approximately to the desired alcoholic content.

Method "E"

Some manufacturers produce cider by means of "concentrates." In this case the juice is centrifuged and concentrated to a jelly form for storage purposes. It is then available to be used at any time by the addition of water and sugar syrup. The centrifuge is used again after re-dilution to check fermentation and to facilitate filtration before bottling. Several Canadian firms have been producing concentrates profitably.

There are certain qualities in cider about which the English trade is very particular. The most important are flavor and body. It has been definitely established that the flavor of centrifuged ciders is much superior to that of filtered ones, as reported in the 1930 Annual Report of the National Fruit and Cider Institute, which has this to say on the subject:

"What may be most nearly described as the 'flavor of the apple,' or the 'fruitiness' of the juice, was much more marked in the centrifuged ciders. In fullness of flavor also the centrifuged samples were invariably fuller and sometimes so superior in this respect that they could be described as 'full bodied' where their filtered duplicates could hardly be rated higher than thin."

Up until 1929 the filter was the accepted method of clarifying cider in England. The filter had the advantages of high hourly capacity and brilliantly clear juice. Its disadvantages were:

1. Cost of filter aid
2. Loss of cider in filter cake
3. Incomplete checking of fermentation
4. Loss of flavor and body

The adoption of the super centrifuge has established the following advantages:

1. Practically checks fermentation
2. Produces much better flavored and fuller bodied ciders
3. Able to clarify easily ciders of high specific gravity that are difficult to filter
4. When used in series with the filter press for producing brilliantly clear juice, the filter will operate *five times* as long before cleaning as it would on uncentrifuged juice, but with no impairment in flavor
5. Centrifuge much easier to clean and operate
6. Lower over-all cost of production

It will be noted that it is necessary to follow the centrifuge with the filter only when brilliantly clear juice for bottling is required.

While the centrifuged juice has a much better flavor than the filtered product, it has been found that filtering the juice after centrifuging in no way impairs this flavor. The exact reason for this remarkable phenomenon is not yet clearly understood, but the fact remains that the flavor of juice clarified by the centrifuge and filter in series is superior to the juice which has been filtered only.

The juice may be centrifuged at capacities of 150 to 400 gal. per hour, depending on the stage at which the centrifuge is used and whether the resultant product is for the draught or bottled trade.

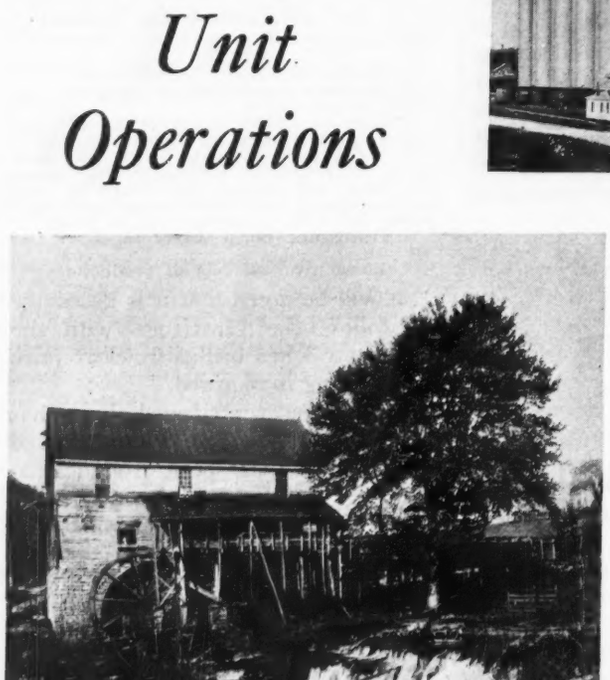
It has been found absolutly essential that the centrifuge be so constructed that all parts coming in contact with the juice are made of solid Monel metal. This eliminates any corrosion due to fruit acids present in the juice, which would ruin steel parts very quickly. At the same time, Monel metal leaves no metallic taste in the cider, which is of extreme importance.

In opening up a new market of this nature, there is always the danger of flooding the trade with an inferior product which disgusts the public. American cider makers should realize that there is a large and profitable market for fermented ciders, provided that full-flavored, high-quality products are offered. There is a golden opportunity this fall to establish the popularity of a beverage that has found so much favor in England.

MODERN CORN MILLING

Involves Many Unit Operations

In marked contrast is the modern corn-milling plant in which the great bulk of milled corn products are produced under highly systematized and technically controlled operations.



Water-driven buhrstone corn mills continue to supply some localities with their time-honored stone-ground meal or grits.

The ancestral water-driven millstone has for the most part been supplanted by a well-appointed plant of many machines working in unison and continuously.

AS SAMP to the pioneer New Englander, grist to our grandfathers, meal or grits to our fathers, and flour to us, ground corn is a native North American food. It has held a paradoxical position in our human diet. In its coarser ground and less highly refined form it has been the theme of the poet's song and a reward for heroic efforts. As a finely milled and a painstakingly packaged product it is ofttimes regarded as too elemental for the pampered palates of city dwellers. By them it is accepted more as an ingredient than chosen as the delectable and nutritious food known so well to our country people.

Yet the corn-milling plant of today would be a revelation to our ancestors, who were familiar with ground corn only as it was produced on the buhrstone mill, driven by a water wheel. A number of these old millstone plants of low production capacity, generally doing a local business, are still in operation today, especially in the South, where stone-ground meal is preferred.

In the main, the commercial corn-mill products that are best known to us are produced in roller mills having large production capacities and are the result of scientific operation of an extensive milling system using many machines. Each plant of this type represents an investment of many thousands of dollars.

The products commonly made on the standard corn mill are hominy, table grits, brewers' grits, standard corn meal, cream meal, granulated meal, cones, corn flour, hominy feed, germ meal and corn oil. Specialties made from corn are in the form of breakfast cereals, flakes, adhesives, fillers and binders.

The processes incidental to the operation of a modern 10,000-bu. per day corn mill located in the corn-producing section of the United States are weighing, shelling, cleaning, conveying, storing, conditioning, separating, drying, grinding, grading by screening and bolting, packaging, dust-collecting and oil pressing. Following through the operation of a modern mill we find that the corn is received at the grain storage department of the mill either from railroad cars, trucks or wagons. If still on the cob, it is likely to be delivered by trucks or wagons and run through a sheller to separate the grain from the cob. The shelled corn passes over a series of coarse screens and through an air blast to be cleaned before going to the bins for storage until needed for milling. The cobs as a rule go to the boiler room, where they are used for fuel.

The corn is drawn as needed from the storage to the mill, where it is again cleaned in a similar method to that previously mentioned, excepting that finer screens are used. From the screening machine the corn passes over a magnetic separator for removal of tramp iron. A scourer in which the corn is rubbed against a rough cast-iron case for the pur-

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pose of removing as much of the germ end of the corn as possible follows the magnetic separator. Under certain crop conditions, this part of the corn is very dark, and will show up in the finished products if not removed early in milling.

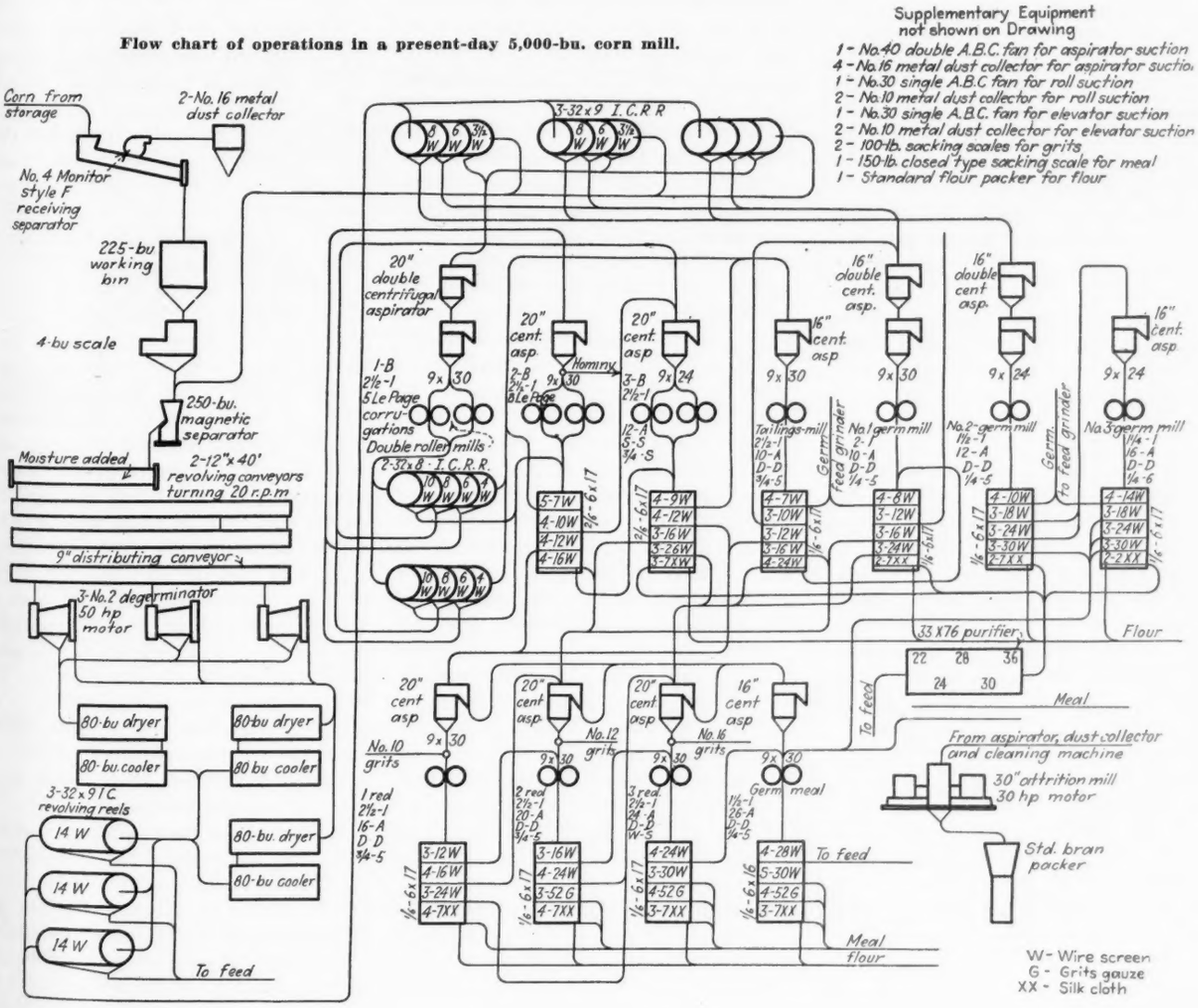
In the localities where the non-degerminating system of milling is used the procedure followed is a little different from that in localities where the full degerminated system is used. Where the non-degerminating system is used the corn is dried to approximately 14 to 15 per cent moisture and sent to the grinders.

Before the grinding process is started in the full degermination system, the corn must be tempered to a point where it becomes tough or not easily broken—to about 22 to 24 per cent moisture content. This is accomplished by two methods. The first is to wet the corn to approximately 24 per cent moisture and allow it to remain in steel or concrete bins for a certain length of time, which varies from two to five hours, depending upon the condition of the corn. The second method is to wet the corn and keep it moving in a slowly revolving screw conveyor for the desired length of time. From either of the above steps corn passes through a short conveyor inclosed in a tight case where live steam is applied for the purpose of loosening the bran and germ.

In the degerminating process the bran and germ are roughly loosened from the starchy part of the corn. A degerminator consists of a slightly tapered cylinder or cone placed within a similar outside case. This machine operates in a horizontal position. The corn enters at the smaller end of the cylinder or cone and passes through to the larger end, where it is discharged from the machine. The cylinder is closely studded with small projections which break the corn by rubbing against the case. The case is of similar construction, with the exception of certain portions which are of perforated metal. The finer particles of broken corn pass through the perforations, while the larger pieces are discharged at the end of the machine. The machine is fitted with a weighted gate, which is set by the operator to regulate the operation of the machine at varying degrees of load or at a point where the best work is performed. An ideal degermination would break the kernel of corn lengthwise in two pieces while rubbing off the bran and germ, but in practice a considerable portion of the corn is broken into smaller particles.

The degerminating process is followed by the rotary steam dryers, where the cracked corn is dried to

Flow chart of operations in a present-day 5,000-bu. corn mill.


Supplementary Equipment not shown on Drawing
1 - No.40 double A.B.C. fan for aspirator suction
4 - No.16 metal dust collector for aspirator suction
1 - No.30 single A.B.C fan for roll suction
2 - No.10 metal dust collector for roll suction
1 - No.30 single A.B.C. fan for elevator suction
2 - No.10 metal dust collector for elevator suction
2 - 100-lb. sacking scales for grits
1 - 150-lb. closed type sacking scale for meal
1 - Standard flour packer for flour
Corn from storage
2-No. 16 metal dust collector
No. 4 Monitor style F receiving separator
225-bu working bin
4-bu scale
250-bu. magnetic separator
Moisture added
2-12"x 40' revolving conveyors turning 20 r.p.m.
9" distributing conveyor
3-No.2 degerminator 50 hp motor
80-bu dryer
80-bu cooler
3-32 x 9 I.C.R.R.
revolving reels
14 W
To feed
3-32 x 9 I.C.R.R.
20" double centrifugal aspirator
20" cent. asp.
16" double cent. asp.
16" cent. asp.
Hominy
Double roller mills
2-32 x 8 I.C.R.R.
Tailings-mill
No.1 germ mill
No.2 germ mill
No.3 germ mill
Germ. feed grinder
To feed grinder
33 X 76 purifier
Flour
Meal
From aspirator, dust collector and cleaning machine
30" attrition mill 30 hp motor
Std. bran packer
No.10 grits
No.12 grits
No.16 grits
Germ meal
Meal flour
W - Wire screen
G - Grits gauze
XX - Silk cloth

approximately 13 per cent moisture content. The smaller material which has passed through the perforations on the degerminators is dried separately from the larger particles, which are delivered from the tail of the degerminator machine. After drying, the stock must be cooled. Machines for this purpose contain ribbon conveyors or agitators which keep the material thoroughly stirred, allowing a free passage of cold air until the desired temperature is reached. This is about 100 deg. F.

"Fines" Removed

The stock from the coolers passes together through a battery, or series, of grading reels which remove the fine material produced by the degerminators. The fine material goes directly to the feed storage bins. Three or more separations are made on the balance of the stock to obtain grades in which all the particles are approximately the same size.

From the grading reels the various grades of the broken corn are sent to the aspirators, usually of the centrifugal type, where the bran is separated from the starchy part of the grain by passing it through a strong current of air. The bran removed here goes directly to the feed grinders for fine grinding, thence to the feed storage bin.

The various grades of products from the aspirators are sent to corrugated roller mills for further reducing to finer grades of products. When a commercial grade of hominy is to be produced, the coarse separation from the grading reels goes to a hominy polisher for polishing, is regraded over special wire screens. and again aspirated to remove any light particles or dust which may have been loosened by the polisher.

As the gradual reduction system of milling is used in producing the finer grades of meal and grits, many separate grinding and bolting operations are used. This system of milling necessitates bolting or screening of stock after each grinding step. Sifters of the gyratory type are used for making the various separations of the stock. Additional aspiration is required after each sifting and grinding step.

Corn germ is of such a nature that when the proper corrugations and differentials are used on the grinding rolls for reducing the starchy part of the corn into meal or small grits, it becomes flattened during the various grinding steps and is easily separated from the meal and the grits during the corresponding screening or bolting steps. A modern corn mill is designed to produce more or less of the finer grades of meal or flour by continuing the grinding and sifting steps to the desired point, or to take off any desired size of grits or meal at the point in the system where they are produced.

As practically all the oil in corn is in the germ, the germ as separated from the corn during the milling process is collected and stored in the working bin. The germ varies according to the quality and variety of the corn. The locality in which the corn is grown has some bearing on the percentage of germ in the corn as well as the quantity of oil contained in the germ. An average analysis would show approximately 6 lb. of germ in each bushel. About 25 per cent of the weight of the germ can be recovered in oil. But in order to produce a feed product with high nutritive value, the general practice is not to remove all the germ. Only about 3 lb. from each bushel. is sent to the oil expeller. As a 20 per cent oil recovery is made by the expellers only 0.6 to 0.7 lb. of oil is obtained from each bushel of corn milled.

Before the germ is sent to the expellers from the storage bins it is passed through additional rotary steam dryers to reduce the moisture to approximately 3 per cent. The oil is filtered through a plate filter press and made ready for shipment as crude corn oil. The germ from which oil has been pressed is reduced to the desired fineness by grinding on attrition or hammer mills and sold as germ meal.

The greater part of the germ remaining in the corn is in the hominy feed, which is composed of the fines produced by the degerminators, the bran removed by the aspirators, the dust from dust collectors, and other parts of the corn bolted out during the milling process. In the full degerminating system of milling the hominy feed portion (offal) amounts to about 30-35 per cent of the weight of the corn used. The old-fashioned buhrstone system of milling produces only about 10-15 per cent offal. The difference stays in the meal.

The various grades of grits or meal are generally weighed on automatic packing scales and packed in cotton or burlap bags. Hominy feed and germ meals are either loaded in bulk cars or packed in burlap bags by means of a standard feed packer. Corn flour is packed on standard flour packers.

A master suction system attached to each machine in the mill removes the dust as fast as it forms. Proper functioning of this system is very important, as fine dust floating in the air or allowed to accumulate in the machines may cause a dust explosion or fire. Although the mill is equipped with unit machines, they are so connected to the source of power by the use of shafting and belts that the whole assembly operates as a unit.

The grain stock is either elevated, conveyed or spouted from the cleaning machines at the head of the mill to the packers for finished product by way of the various machines in the sequence required for the milling steps previously described. The unit machines connected in this manner operate with very little manual labor, as each machine performs its function simultaneously, thus making a continuous system of milling.

Milled Corn Products

As unusual as it may seem, there are no definite specifications defining all the products produced by a corn mill. The term hominy or hominy grits is quite generally applied to the milled product which will pass through a No. 3½ or No. 4 and remain on top of a No. 6 mesh wire screen. The term coarse grits applies to a product passing a No. 10 and remaining on top of a No. 12 mesh wire screen. Medium grits pass a No. 12 and remain on top of a No. 16 mesh wire screen. Fine grits pass a No. 16 and remain on top of a No. 20 mesh wire screen. The medium and fine grits combined make up the product called "brewers' grits." Extra fine grits pass a No. 20 and remain on top of a No. 24 mesh wire screen.

All the above are free from dust and bran and milled from the hard or flint portions of the corn with a fat content below 1 per cent and moisture below 14 per cent. Cream meal may be bolted through a No. 24 mesh wire screen and dusted over a No. 8xx silk for one locality, while another community may desire a much finer product, often equal to a No. 40 mesh wire screen.

Cones are a finer grade of meal, granular in texture and free from dust or flour. This product is sifted through wire or silk screens varying from 40 to 52 mesh per square inch.

A good grade of corn flour is bolted through a No. 9xx silk.

Food Marketing Agreements Still in the Making

Those in preliminary stages show wide divergence of trade practices

DEPOSIT of proposed codes or marketing agreements with the Agricultural Adjustment Administration by many of the food industries has enabled the plants affected to comply with the President's Reemployment Agreement with modifications in wage and time schedules adapted to their operations. Actual progress by the A.A.A. in the approval of food codes has been slow. The Chicago milk licensing agreement, the Philadelphia marketing agreement, and the California cling peach marketing agreement were the only ones that had been officially promulgated to Aug. 22. Aside from numerous other territorial milk agreements, only a few proposed agreements or codes affecting food processing and distribution had been formally docketed, although scores are in preliminary stages of consideration.

Blue Eagle Codes

Modified P.R.A. agreements accepted by the National Recovery Administration, on certification from A.A.A. that proposed codes or marketing agreements have been filed, embrace canning, Pacific Coast dried fruit, cheese, corn products, meat packing, fruit and flavoring syrups, confectionery, evaporated milk, fluid milk, sausage casings, mayonnaise, ice, ice cream, wheat flour milling, yeasts, terminal grain elevators, food and grocery distributors, restaurants.

The A.A.A.'s formal docket of marketing agreements includes butter, evaporated milk, dry skim milk, frozen desserts, Northwest deciduous fruits, California deciduous fruits (code), New England mackerel (code).

Butter—The agreement proposed by the American Association of Creamery Butter Manufacturers and the National Cooperative Milk Producers' Federation is prefaced by a statement that the plan suggested by the exchanges for correcting existing evils should be given reasonable trial, that lands withdrawn from crop production should not be used in dairying, that prices of butter and other milk products should be properly correlated, that the marketing agreement should be supplemented by a clear-cut code of retail trade practices condemning, among other things, the use of butter as a loss leader. A National Butter Board of butter manufacturers and milk producers would be created to revise, when desirable, subject to approval by the Secretary of Agriculture, the rules set up by the marketing agreement to govern the procurement of butter fat and butter sales to retailers.

The Butter Board also would be authorized to fix, subject to the Secretary's approval, weight tolerances and minimum price differentials for the various styles and packages of butter, to recommend remedial action to stabilize prices when the exchanges fail to cooperate, and to collect and compile information regarding exchange trading and data on consumption of butter fat and butter. A subcommittee on Procurement of Butter Fat would be charged with recommending rules to promote orderly marketing of butter fat and improvement in quality of cream. Another subcommittee would perform a similar function with respect to the marketing of butter. Every butter manufacturer would be required to report monthly his production to a designated agency.

Dry Skim Milk—The dry skim milk marketing agreement requires manufacturers to adhere to uniform differential price schedules, based on quantity, for both dry skim milk for human consumption and for feeding, with the carload as the base price. The price differentials per pound are embodied in the agreement, which also covers sales trade practices. Each manufacturer is required to report to the industry's managing agent a complete list of his selling prices, as often as changed. Written notice of such changes will be given to all manufacturers by the agent. All manufacturers are required to report monthly their production, purchases, sales and stocks of dry skim milk. Where skim milk is purchased as skim milk the purchase price must be reported and where whole milk is purchased and the milk separated, a value must be placed on the skim milk and this figure and the price of the whole milk must be reported.

Evaporated Milk—The proposed agreement of the evaporated milk manufacturers embodies the formula for calculating the minimum prices to be paid to producers for milk and fixes both minimum and maximum delivered prices of evaporated milk in carload lots to wholesale distributors, subject to changes as agreed upon between the industry's committee and the Secretary of Agriculture. On less-than-carload lots the minimum is 5 cents per case higher. Sales direct to the retail trade must be made at prices in line with terms available to such retailers from recognized wholesale distributors. Questionable transactions will be investigated. Retailing manufacturers must add 10 per cent to the minimum wholesale prices, but may meet competitive prices if, when reported by them to the industry's committee and the Secretary of Agriculture, the situation is not corrected within a reasonable time. Trade practice rules authorize an allowance of 5 cents a case to buyers who furnish their own labels; no allowance on confectioner size. Allowance also may be made for the actual cost of boxes furnished by buyers, but not to exceed 5 cents a box. Can sizes are restricted to 6 oz., 14½ oz. and 8 lb. by weight. Rebating to wholesale distributors upon a decline in price is permitted to the extent of 2,000 cases received by the wholesaler within 90 days prior to the decline and still in warehouse on that date.

Frozen Desserts (Ice Cream)—The national licensing agreement for frozen desserts proposed by the International Association of Ice Cream Manufacturers contemplates adoption of "affiliated" territorial agreements. The minimum prices for fluid milk and cream in areas where no local agreement for frozen desserts is in force shall be those set forth for manufacturing purposes in any other agreement for fluid milk and cream for such area entered into by the Secretary of Agriculture. In areas where an agreement for frozen desserts is in force, the minimum prices paid for fluid milk and cream shall be those set forth in such agreement, whether or not there is another agreement in force in such area for

fluid milk and cream. In areas where there is no agreement for frozen desserts nor for fluid milk and cream the minimum prices paid shall be based on the prices for 92-score butter in the New York, Chicago or Los Angeles market, whichever may be the nearest, plus a number of cents premium per pound for butter fat, to be determined by the emergency national committee, subject to approval by the Secretary of Agriculture after public hearing and by 60 per cent of the industry by gross volume of sales in 1932. There is a proviso to the effect that if other branches of the industry do not sufficiently cooperate in stabilizing fluid milk and cream prices, the minimum price may, with the Secretary's approval, be eliminated permanently or temporarily from the frozen-dessert agreement.

In the sale of frozen desserts for resale, the proposed national agreement authorizes a discount of 10 cents a gallon to any person or firm operating more than five separate retail outlets from the regular wholesale price established by marketing agreement, in addition to any other discount. No discounts may be allowed except for ownership of refrigeration equipment, quantity purchases, sales to places under single ownership, and for cash on delivery. Where cabinet rental charges are part of the price structure, each manufacturer must keep a record of gallonage delivered to each separate place of resale.

Fair practice rules embodied in the agreement prohibit the sale of frozen desserts containing butter fat in excess of the standard set in each area without a proportionate differential in price. Bootlegging ice cream, the practice of using refrigerating equipment belonging to another manufacturer without his written consent, also is prohibited. The pint liquid measure of 16 fluid ounces is adopted as the unit for determining the minimum retail price in any local trading area, and the price of units less than a pint must in the aggregate exceed the pint price. Frozen desserts are defined in the agreement as ice cream, frozen custard, ice milk, ice and ice sherbet, and products in which any of the foregoing is an ingredient.

Mackerel Code — The proposed code of the New England mackerel fishing industry would empower the executive committee of the Fishing Masters Producers' Association to license the operations of mackerel vessels and traps, to fix minimum prices based on mackerel production costs as determined by the U.S. Bureau of Fisheries and approved by the Department of Agriculture. The code also provides for the pooling of trips to protect individual producers from hardship incident to the vicissitudes of the business.

Canned Foods—National Canners' Association filed its agreement (and/or code) with A.A.A. on July 29. The date for hearing will be announced later. The code provides for subsequent appointment of code authorities. First is a processors' committee, which is to establish sound production and marketing policies in the industry. Members of this committee are to be nominated by the association with the approval of the Secretary of Agriculture or the President (of the United States).

Second are the commodity committees, to be appointed by the Secretary or President from nominations by the processors' committee, and will be charged with administering the policies of the agreement and the processors' committee by commodities.

The important feature of the agreement is Article VII, which provides for restriction or allocation of a crop or pack. This feature has already been put to work in the peach canning group of California.

Flavoring Extract—The Flavoring Extract Manufacturers' Association began operating on a 40-hour week on Aug. 1 under a P.R.A. code, and has filed its agreement with A.A.A. The latter forbids selling below cost, also forbids guaranteeing floor stocks, which have been paid for, against price declines, as well as guaranteeing price contracts against advance or decline for more than 90 days. No premiums may be used.

Wheat Flour Milling—The millers of wheat flour have filed a code which calls for licensing all millers and prohibits any license being issued to any concern which has not been in active operation for 90 days during a three-year period prior to adoption of the code, and further prohibits any increase in capacity or operation of new equipment except to replace capacity destroyed by fire or abandoned capacity.

Other Codes—In addition to codes and marketing agreements previously listed as having been accepted as qualifying the sponsors for modification of the President's Reemployment Agreement, other codes that, on press date, were in preliminary stages of consideration by A.A.A. include fresh water fish, potato chips, oleomargarine, baking powder, self-rising flour, rice, crabs and crab meat, flour distributing, tea, preserves, vinegar, soft drinks, Florida avocados, California calavos, licorice, bakery goods, livestock, refrigerated warehousing, food brokering, and the wagon route industry as represented by the National Retail Tea and Coffee Merchants' Association.

Syrup—The National Syrup and Molasses Association set up a proposed master code at its Chicago meeting on Aug. 4 and 5, 1933. It provides for "code authorities" to set up later a code of fair practice for each of the several products, eight groups in all, which come under this association. But the proposed master code contains the following curious clause (Sec. IV):

"No person or others shall become a processor without the consent of the Secretary of Agriculture," although Sec. X states: "This code is not designed to promote monopolies or monopolistic practices."

Biscuits and Crackers—The code adopted by the Biscuit and Cracker Bakers' Association would restrict the number of ovens in the industry to the present number until demand exceeds the fullest possible use of existing oven capacity, and provides a single shift of 40 hours per week per oven, with allowance for permissible increase to 160 hours of oven operation to care for seasonal demand in a six-month period.

Oysters—A proposed code from the Oyster Growers and Dealers Association of North America, Inc., is to be submitted to N.R.A., for oysters are not yet classified as agricultural products, despite the fact they are farmed. The code provides, in addition to usual features, that all prices are to be quoted f.o.b. shipping point, no consignment sales, and sets up a national committee, having one representative for each $1,000,000 reported sales for each division of the industry, charged with planning and coordinating for the industry. This committee shall appoint a control committee of three to act as an executive committee.

Baking Powder—The code proposed by the baking powder division of the Associated Grocery Manufacturers provides for sale on the basis

of open prices, strictly construed to prohibit any direct or indirect concession, to be filed by each manufacturer with the association. A quantity price must be a genuine quantity price, and the code prohibits payment to trade buyers for any special advertising or distribution service except on bona fide contract for service rendered that, in case of printed advertisements, payment shall not exceed lineage. No payment is allowed for counter, window, floor or shelf display. The code proposes a 40-hour week and minimum wages of 40 cents an hour for male and 30 cents for female employees.

Oleomargarine — The proposed oleomargarine code would provide that an industry council shall determine from time to time, subject to approval by the Secretary of Agriculture, the minimum base price in territory north of the southern boundary of Virginia, Kentucky, Arkansas and Oklahoma and east of a line running north along the eastern boundary of Colorado, Wyoming and Montana, but including California, Washington and Oregon. All other territories would be priced 1½ cents over base territory to cover additional freight. The code would prohibit selling to retailers direct who sell to consumers at prices less than manufacturers' list price to retailers plus 10 per cent. The code also would cut off sales to wholesalers in the event that retailers buying from such wholesalers resell to consumers at less than manufacturers' list to retailers plus 10 per cent. The code would establish a minimum wage of 40 cents an hour for male employees, 30 cents to female employees in the North and 25 cents to female employees in the South.

Cold Storage—The code of the Association of Refrigerated Warehouses sets up a national board and zone committees for administration. It provides for the publication of tariffs and rate schedules, with the carload unit as the basis of minimum rates and no discount for quantity. Quotations on a monthly basis must separate handling and storage charges. No changes in rates and charges may be made except on 30 days' notice. Failure to assess adequate and separate charges for each of the following services will be deemed a violation: extra sorting, candling, repacking, weighing, recoopering, inspections for customers, service outside usual business hours, making collections on request of customers, extra labor or service and special clerical work. Monthly storage charges, interest, insurance and all other charges shall be billed and payable monthly, whether or not merchandise has been removed from warehouse. Loans against warehoused commodities are limited to 70 per cent of the current wholesale market price at point of storage, and warehousemen are expected to maintain a margin of not less than 30 per cent thereafter. The rate on such loans shall not be lower than that charged on this class of loans by commercial banks in the same locality plus a surcharge sufficient to cover overhead and expense attached to such loans. Loans are limited to goods actually in storage or under control of warehousemen in transit to warehouse. Construction of new or additional refrigerated space, including federal, state and municipal agencies, would be subject to license by the Secretary of Agriculture. The code would fix 40 hours a week, with a 10 per cent tolerance for office employees, and an average of 40 hours per week per quarter, with a maximum of 56 hours for mechanics. The P.R.A. wage minima are adopted for office employees. The minimum for mechanics would be 35 cents in the North and 25 cents in the South. Maximum hours would not apply to establishments employing not more than two persons in towns of less than 2,500.

Brokers—The code filed by the National Food Brokers' Association prohibits splitting of brokerage with buyer or seller and bars a broker from representing as sales agent two or more principals engaged in the same or competing lines or if he himself is a principal. No broker would be permitted to buy or sell for his own account for speculative purposes or for any other purpose except as a necessary part of brokerage service. Substitution of products for those ordered would be an unfair trade practice. Where not extended to all purchasers under like terms and conditions, rebates, refunds, commissions, brokerages and unearned discounts or other allowances would be banned. Minimum wages would be $15 a week to office employees and $10 for office boys, messengers and porters. The code proposes a 40-hour week, with permissible overtime of 8 hours a week to be paid for at time-and-a-half.

Fresh-Water Fish—The code filed by the Fishermen's Cooperative Association fixes neither hours nor wages in fresh-water fishing operations, as vessel owners and crew share on a profit-sharing basis. The executive committee reported that it is studying the practicability of establishing a minimum wage at least equal to the P.R.A. requirements. The code would set up a resident price control committee to decide upon prices to be paid in Chicago, New York and other markets by wholesalers and distributors and also by the public. All wholesalers or distributors of fresh-water fish would be required to post a bond with the association or Department of Agriculture to guarantee payment to shipper fishermen.

Baked Goods—The Baking Industry Code Conference had, at press time, not yet filed its Code of Fair Practice. Its labor code is already filed, and proposes an average of 45 hours a week over a three-month period with its maximum of 54 hours in any one week and 10 hours a day in the plant. Minimum wages are 40 cents an hour in the North and 35 cents in the South. It is reported, however, that the fair practice section of the code is nearly ready and will prohibit the return of stales, except wrapped pies, and provides that old bakery products may be sold only at the point of manufacture. A National Bakers' Council with Henry Stude as permanent chairman will administer the code.

Tea—The tea industry's code fixes a 40-hour week, with 48 hours permitted in the plant during any 12 weeks in a year. The minimum wage would be 37½ cents an hour for men and 30 cents for women. The minimum for office employees would be $15 a week, except office and errand boys, $12.

Licorice—The licorice industry's code fixes a 40-hour week, with a minimum wage of 36 cents an hour to plant employees and $14 a week to office employees.

Confectionery—Although the confectionery industry has filed a P.R.A. (Blue Eagle) Code, its code of fair competition has not seen the light of day as far as could be learned at press time. In a preliminary hearing, the first draft contained a clause, since rejected by N.R.A., which would have prevented any newcomers from entering the industry.

Corn-Hog Agreement Plans Taking Shape

A PROCESSING TAX will be levied on pork on or after Oct. 1, the beginning of the marketing year, to provide funds for removing surplus hog production. The initial tax will be ½ cent, or less, per pound of live hog. The A.A.A. would like to make it twice or triple that amount, but must reckon with the stupendous floor stocks of lard and other pork products, which are above the past 5-year average. A heavy tax would demoralize the business of many packers who have been trying to sustain the income of hog producers by carrying on operations without an immediate market.

The half-cent tax would, according to the A.A.A., provide sufficient funds for the emergency program now under consideration. This is based on recommendations presented at a conference Aug. 10, when the National Corn-Hog Producers' Committee proposed removal from the domestic market, prior to Jan. 1, of slightly more than 600,000,000 lb. of pork and pork products and a total of about 1,800,000,000 lb. during the coming marketing year.

To accomplish this, the committee recommended a premium of $4 a head, plus the removal of the usual dockage, on 1,000,000 brood sows above 275 lb., soon to farrow; and the purchase of 4,000,000 pigs from 25 to 100 lb. average, at prices ranging from $9 per hundredweight for 25-40 lb. to $6 per hundredweight for 91 to 100 lb. Meat and meat products from the best of these animals would be disposed of by sale on a "moderate" basis to relief agencies on the condition that their normal purchases would not be curtailed. The remainder would be condemned, tanked, and such salvage realized as would not seriously injure the usual demand for this product.

To finance this program, the committee recommended a "very substantial or restrictive processing tax" on all hogs above 235 lb. live weight, other than packing sows, at the earliest practicable date and that a processing tax be levied on all hogs marketed in the usual way during the next twelve-month period.

Under a proposed hog-marketing agreement submitted to the A.A.A. by the U.S. Livestock Association and the National Livestock Exchange, "all hogs purchased by a processor at a stockyard posted under the provisions of the Packers and Stockyards Act, 1921, shall be sold by and bought from a market agency representing the producer duly registered under the Packers and Stockyards Act, 1921, and licensed by the Secretary under the provisions of the Agricultural Adjustment Act, and in accordance with the terms and conditions of such license."

Sponsors of the agreement propose that "no processor shall acquire any hogs for processing at a plant located at such a posted public stockyard, or within the switching limits thereof except by purchase upon a posted public stockyard."

Sales of hogs to processors by market agencies at posted public stockyards would be made and consummated under and pursuant to the rules and regulations promulgated by the Secretary under the Packers and Stockyards Act, 1921, and in accordance with the rules and regulations of livestock exchanges with respect to conditions and ethics of trading.

The proposed agreement provides that sales of hogs to processors elsewhere than at posted public stockyards be consummated by sales supervisors designated and licensed by the Secretary. It asks that sales supervisors manage these sales upon the individual merit of each owner's lot or lots of hogs, after sorting, feeding, watering and preparation for sale in such manner as would net the greatest aggregate amount at prices equivalent and equal to prices paid for hogs of similar grade and quality sold upon the same market day at some posted public stockyard which is recognized as the "basing point," plus or less such differential as may be found by the Secretary to be fairly representative of the shipping or transportation cost (including shrinkage) necessary to equalize the price so to be paid with the "basing point" price. The agreement proposes to designate the posted public stockyard nearest to the point of sale of hogs to a processor, designated by the Secretary as a price-determining market in respect to hogs for the territory which includes the place where the sale occurs.

The agreement in its preliminary form proposes to require that "no hogs so purchased or acquired by processors, directly or indirectly, at places elsewhere than posted public stockyards, shall be resold or reshipped by the processor after purchase, but shall be slaughtered and processed at a plant located at the "point of purchase."

Dr. Howe, as Consumers' Counsel, Sits on Price Bulges

THE A.A.A. plan to prevent price gouging assumes that if consumers are given the facts, no food processor or distributor can raise prices far above the level warranted by the imposition of processing taxes and higher labor costs. Dr. Fred C. Howe, consumers' counsel, is utilizing the press and the radio to keep the public constantly informed of the relation of price increases to increased costs. Consumers are organizing local councils to insure fair dealing. Evidence of unwarranted price advances will be received by the A.A.A. and complaints will be referred to the Department of Justice.

The A.A.A.'s concern is felt not only for the consumer at large but for the farmer. The objective of the A.A.A. program is defeated if the advance in prices is not reflected in the return to the farmer on his crop and if his larger return is entirely absorbed by the prices paid out for the goods he must buy. Dr. Howe's publicity system has five features:

1. Weekly publication of retail prices on bread, milk, meat and other staple foods. Statistics are gathered from more than 1,000 stores—chains, independents and specialty food shops—in 50 cities by field representatives of the Agriculture and Labor departments. Figures are weighted and averaged so that consumers get a picture of price trends throughout the country as well as of local prices.

2. Retail prices will be checked back to show the amount that the farmer gets for the raw materials.

3. Increases in labor costs result-

ing from wage raises and new employment and how much this accounts for in the increased price of foods will be reported.

4. Prices that farmers are having to pay will be reported. This will include all kinds of commodities and will serve, when weighed against prices received from sale of raw materials, as an index of the buying power of farmers.

5. Special bulletins covering all the foregoing features will be prepared for distribution, on request, to consumer groups and individuals.

A test of the fairness of the bread price advances reported from the eighteen cities was made by Dr. Howe by comparing the spread between the price the farmer is getting for a bushel of wheat and the price the consumer pays for the 62 loaves of bread made out of that bushel. On Aug. 2 the spread amounted to $3.85, including the 30-cent processing tax. With the tax deducted, the spread is 2 cents less than it was on June 15, and only 5 cents more than it was last January.

Average price changes in each of the eighteen cities covered by the Aug. 2 survey are given in the following table. Figures also are presented for the first time on a pound loaf of rye bread.

Average prices for Aug. 9 for the same brands and stores remained at the Aug. 2 level: 1.4 cents above the Feb. 15 average.

Retail Bread Prices, Aug. 2, 1933

City	White Bread per Pound Aug. 2[1] Cents	White Bread per Pound Feb. 15[2] Cents	Indicated Change in Price Cents	Rye Bread Per Pound Aug. 2[1] Cents
Baltimore	7.3	6.6	+0.7	8.5
Boston	7.2	6.3	+0.9	8.3
Charleston	8.9	7.2	+1.7	9.2
Chicago	7.1	6.1	+1.0	7.3
Cincinnati	7.8	5.3	+2.5	8.9
Cleveland	7.3	5.4	+1.9	8.0
Dallas	6.5	4.9	+1.6	7.0
Denver	7.2	5.9	+1.3	8.4
El Paso	8.8	...	.....	8.4
Kansas City	7.6	6.7	+0.9	8.6
Los Angeles	8.0	7.2	+0.8	10.2
Memphis	8.8	6.7	+2.1	8.4
Minneapolis	7.6	6.5	+1.1	7.4
Mobile	9.0	7.4	+1.6	10.0
Philadelphia	7.4	6.3	+1.1	8.4
San Francisco	9.3	8.3	+1.0	9.4
Sioux City	7.6	...	.....	7.2
St. Louis	8.0	6.2	+1.8	8.0
Average	7.8	6.4	+1.4	8.4

[1] Data reported by field offices of Bureau of Agricultural Economics.
[2] Data reported by mailed questionnaire to Bureau of Labor Statistics.

Dairymen Clamor for Codes; May Have Blanket Agreement

WITH big city milksheds throughout the country clamoring for action on proposed territorial agreements, the A.A.A. is giving consideration to a blanket agreement covering the production and distribution of fluid milk. This would not interfere with negotiation of agreements covering separate milksheds, but would assure an increase in prices to producers at an earlier date.

Provisions of the national agreement embodying wholesale and retail price schedules are still conjectural. It is quite apparent that, initially, consumers would have to bear the total increased cost. But the intention subsequently is to require distributors to shrink their costs, now absorbing what is reported to be a disproportionate amount of the price paid by consumers. Unification of delivery services is regarded as one method of attack on the high cost of distribution, despite considerable evidence that this is not a vulnerable spot (FOOD INDUSTRIES, January, 1932, p. 27).

Since approval of the Chicago milk agreement, July 29, numerous hearings have been held, but no action has been taken by A.A.A. on pending agreements for milksheds serving Atlanta, Baltimore, Boston, Charlotte, N. C.; Cincinnati, Detroit, Evansville, Ind.; Kansas City, Knoxville, Los Angeles, Louisville, Minneapolis and St. Paul, New Orleans, Oakland, Philadelphia, San Francisco, San Diego, Toledo and elsewhere. In some cases, prices to producers had been advanced in anticipation of prompt approval of agreements, but distributors now are rebelling. The Chicago agreement established no differential between wagon and store prices and this is a controversial issue in other territories.

Having filed a marketing agreement that is pending in the A.A.A., the International Association of Milk Dealers was able to obtain acceptance by N.R.A. of the labor provisions as a substitute for the appropriate sections of the President's reemployment agreement. The code fixes a maximum week of 48 hours for pasteurizing plant and factory workers and a 6-day week for route salesmen with a provision that the latter may take four consecutive days off in any four-week period in lieu of one day weekly. A 40-hour week for office employees is subject to 10 per cent tolerance monthly. The minimum wage rates are the same as those fixed in the P.R.A. The maximum-hour provisions do not apply to plants employing six or less in towns of less than 2,500.

In an attempt to cope with one aspect of the dairy industry's plight, the A.A.A. announced Aug. 17 that it will advance $30,000,000 to remove surplus butter and cheese from the market, on the condition that the output of dairy products is curtailed.

The A.A.A. apparently had abandoned consideration of a proposal to reduce the number of dairy cattle, either by offering a premium to encourage marketing or by paying so much a head for the slaughter of cattle pursuant to a rigorous campaign for the eradication of tuberculosis and contagious abortion.

In view of the wide controversy as to whether there should be a price differential between milk sold at the store and that delivered to the home, the dairy industry will be interested in the results of a survey made by the Food Industries Advisory Board for A.A.A. This survey indicate that producers supplying areas rec ognizing the difference in distribution costs to homes and stores get more than 25 per cent more for their products and that 41 per cent more milk is consumed in those areas.

The following table compares the producers' return and the consumption of milk in eight cities where a price differential exists, with the price to producers, and the consumption in eight other cities that do not have a price differential.

	Producer's Return (per Cwt.)	Per Capita Consumption (Pints per Day)
	With a 1c and 2c differential	
New York	$2.81	1.065
Philadelphia	2.27	.901
Detroit	1.50	.875
Boston	2.74	1.201
Cleveland	1.55	1.333
San Francisco	1.79	.843
Washington	2.67	1.150
Hartford	2.59	2.027
Average	$2.24	1.1744
	Without a differential	
Baltimore	$2.38	.505
Wilmington	2.07	.724
Milwaukee	2.00	.891
Lincoln	1.52	1.071
Wheeling	1.15	.926
Macon	1.44	.720
Chicago	2.10	.920
Aberdeen	1.45	.895
Average	$1.76	.8315

TEXT OF PROPOSED GROCERY INDUSTRY MASTER CODE

Signed at Washington, D. C., Aug. 23, 1933, by representatives of the National Association of Retail Grocers of the United States, Inc.; the National and American Wholesale Grocers' Associations; National Retailer-Owned Wholesale Grocers' Association; the National Chain Store Association and Food Chain Store Distributors; the Voluntary Groups Institute; Associated Grocery Manufacturers of America, Inc.; National Food Brokers' Association and Food and Grocery Conference Committee.

Having been filed with the officials of the A.A.A., the plan of procedure now calls for an early preliminary meeting between representatives of the government and the Master Code Committee. In subsequent open hearings members of the grocery industry will be given an opportunity to pass judgment on the terms of the code before it is finally declared operative.

PROPOSED MASTER CODE OF FAIR COMPETITION IN DISTRIBUTION IN THE FOOD AND GROCERY INDUSTRY

Article I—Purpose

In order—(1) to effectuate the public policy declared by the National Industrial Recovery Act of June 16, 1933, and the Agricultural Adjustment Act of May 12, 1933, respectively, in the food and grocery industry, namely, the public policy of rehabilitating industry and agriculture by relieving unemployment, improving labor conditions, enlarging purchasing power, eliminating unfair competitive practices, increasing the prices of farm products by eliminating such practices, maintaining distribution costs on a sound basis to insure reasonable prices to the consuming public;

(2) to supplement and coordinate codes of fair competition and marketing agreements by divisions of the food and grocery industry, under said acts, respectively, prescribing maximum hours of labor and minimum rates of pay and other conditions of employment, etc., in realization of such public policy; and

(3) to eliminate uneconomic and unfair trade practices from distribution in the food and grocery industry, in further realization of such public policy; this master code of fair competition in the food and grocery industry is hereby established under and by authority of Sec. 3 of Title I of the aforesaid National Industrial Recovery Act, and therefore has a binding legal force and effect accordingly.

Article II—Definitions

Sec. 1. As used in this code, the term "food and grocery industry" means the industry of grocery manufacturers, food brokers, wholesale grocers, retail grocers, and all others who perform any or all of the functions of the aforesaid.

Sec. 2. As used in this code, (1) the term "grocery manufacturer" means any manufacturer, canner, packer, bottler, and other processor or producer (exclusive of a farmer), and also every importer, of a product or products, who is engaged in the business of selling or supplying such product or products to wholesale and/or retail grocers.

(2) The term "food broker" means any sales representative who performs the services of negotiating the sale of food, grocery or kindred products for and on account of the seller as principal, and whose compensation is a commission or brokerage paid by the seller.

(3) The term "wholesale grocer" means any dealer wholly or partially performing the functions of wholesale distribution (exclusive of a farmer as a producer and excepting strictly manufacturing operations) engaged in the business of assembling, distributing and selling raw and/or prepared foods, and merchandise entering into or used in connection with or in the keeping, processing or preparing of the same for use or consumption, and such other merchandise as is by custom classified and commonly referred to as part of a grocer's stock.

(4) The term "retail grocer" means any dealer whose business (in whole or in part) is the sale at retail of raw and/or prepared foods, and merchandise entering into or used in connection with or in the keeping, processing or preparation of the same for use or consumption, and such other merchandise as is by custom classified and commonly referred to as part of a grocer's stock.

(5) The term "grocer manufacturer" or "food broker" or "wholesale grocer" or "retail grocer," respectively, designates either an individual or a partnership or a corporation or an association, as the case may be.

Article III—Open Price Competition Required

Sec. 1. Each grocery manufacturer and each wholesale grocer shall sell upon the basis of open prices *(a)* which shall be uniform to all trade buyers of the same quantity under the same conditions, located in the same competitive market, and *(b)* which shall be strictly adhered to, while effective.

Sec. 2. The term "open prices," as used in this article, means a price list *(a)* which is published or is available for the equal information of all trade buyers alike under the same conditions, located in the same competitive market, and *(b)* which states all the seller's prevailing terms of sale.

Sec. 3. This article is to be strictly construed to prohibit any direct or indirect price concession by a grocery manufacturer or a wholesale grocer to any trade buyer which is not an open price as aforesaid. The term "indirect price concession," as used in this section, means any price concession indirectly made by a grocery manufacturer or a wholesale grocer to a trade buyer through a rebate or allowance or commission or refund or payment or deal or gift or by any other means whatever. This section shall not apply to uniformly made adjustments for overcharges.

Article IV—"Loss Leader" Sales Prohibited

Sec. 1. No grocery manufacturer shall offer or sell a product at or below its cost to him either *(a)* to prevent or suppress competition with him or *(b)* without a legitimate business reason justifying such action. The term "cost," as used in this section, means the production cost of the product plus a reasonable distribution charge.

Sec. 2. (1) No wholesale grocer shall offer for sale or supply any merchandise at prices less than the prevailing market cost f.o.b. point for wholesale distribution, within ten (10) days prior to date of sale (which cost shall not take into consideration the cash discount which has been customarily received for prompt payment) plus a reasonable markup to at least partially cover expense of doing business. This markup shall in no event be less than 2½ per cent net. Provided, that any wholesale grocer may meet the price lawful under this code or any other code under the aforesaid Act, of any other dealer at wholesale.

(2) The foregoing shall not apply on accommodation sales between dealers at wholesale, nor shall it apply to any sale made in closing out in good faith the owner's stock or any part thereof for the purpose of discontinuing his trade in any stock or commodity, or in disposing of seasonal or damaged goods and merchandise requiring immediate movement into consumption to prevent loss.

Sec. 3. (1) No retail grocer shall offer for sale any merchandise at or below its delivered cost to him within ten days prior to date of sale, plus a reasonable markup to at least partially cover the expense of doing business, which shall in no event be less than a minimum markup of 7½ per cent.

(2) Delivered cost as herein used shall mean invoice or purchase cost, if purchased within 30 days, or replacement cost if purchased prior thereto, plus cartage or transportation charges to point of retail distribution, but cash discounts customarily offered to induce prompt payment shall not enter into cost determination. Provided that any retail grocer may meet the price lawful under this code or any other code under the aforesaid Act of any other dealer at retail.

(3) The foregoing shall not apply on accommodation sales between dealers at retail, nor shall it apply to any sale made

(Turn to page 384)

Committees Key of Borden Truck Safety Plan

AS BUSINESSES increase in size, operating functions are liable to become unwieldy and inefficient unless the multiplicity of the operations are controlled by some simple system which, while subject to centralization, is satisfactory for the smallest operating unit of the company. This is true of accident prevention work and particularly that having to do with the safe driving of motor vehicles and horse wagons.

The safety organization of The Borden Company, which is built up around a local safety committee in each operating branch or plant of the Borden subsidiaries, is operative irrespective of the number of branches and is subject to the centralized control of the director of safety. For these reasons it may be used as a pattern by other companies in the food field with operating branches.

Résumé of the System

As explained by Henry J. Mineur, director of safety, the Borden safety organization considers safe driving in the same light as any other part of the employee's performance record. The Borden system of awards provides recognition for those who drive for an extended period without an avoidable accident. It is supplemented by a definite disciplinary policy for those who have avoidable accidents. A reprimand; suspension without pay or discharge are the penalties imposed in the order mentioned for successive accidents.

The entire plan is educational in character. Where education fails, the penalty system is resorted to for the enforcement of safe driving rules. There are no automatic penalties except for driving while intoxicated or violation of the law. In such cases the employee involved is suspended until the safety committee determines the question of cause and responsibility.

The local safety committee consists of from three to five members selected from the departments of plant or manufacturing; delivery or sales; vehicular equipment and building or premises. It meets at least once every two weeks in units where there are 25 employees and at least once every month in units where there are less than 25 employees.

The duties of the committee are to deal with accident prevention in all its phases and to consider it a normal operating problem. Regular minutes of meetings are kept and copies sent to the director of safety of the Borden Company at 350 Madison Ave., New York, N. Y.

General rules are provided for the guidance of the local safety committees. These rules are classified under the headings of Employment; Vehicle Maintenance and Repair; Plant Conditions and General. Each Borden employee is required to read and sign a printed sheet of Instructions to Employees for Greater Safety and Service.

In operation, the local safety committee reviews at each meeting all accident reports rendered since the prior meeting and determines the responsibility in each case, rating the accident by Class A, B, C or D as defined at the end of this article. The rating is then placed on the employee's individual record card. The committee then recommends action based on the complete record of the employee. This action is also recorded on the card.

The Borden safe-drivers award system made effective on Jan. 1, 1933, consists of a certificate issued to each driver for quarterly periods if he has not had a preventable accident. A silver lapel emblem is awarded in addition for safe driving for 12 consecutive months; a silver emblem with two stars for 2 years and a gold emblem for 3 years. Bronze plaques are awarded to branches with the best accident records.

Classes of Accidents

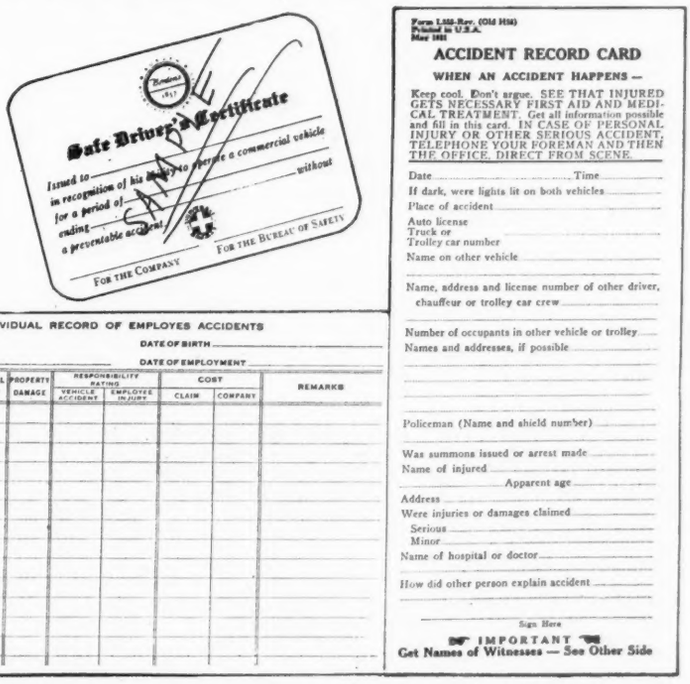
The responsibility ratings applicable both to collision and industrial accidents are as follows:

CLASS A—Applies to all cases in which it is decided that the accident was due solely to conditions or conduct over which neither the company nor the employee has any control.

CLASS B—Applies to all cases in which it is decided that conditions, conduct, operating procedure, or practice subject to the control of the company was responsible.

CLASS C—Applies to all cases where conditions or conduct beyond the control of the employee might have been instru-primarily responsible, but the exercise of extraordinary precautions on the part of the employee might have been instrumental in effecting prevention.

CLASS D—Applies to cases in which responsibility is divided or the burden rests upon the employee. This class will include all cases where it is evident that the action of the employee, independent of conditions or the conduct of others, would have prevented the accident.



Safe Driver's Certificate

Issued to _____ in recognition of his ability to operate a commercial vehicle for a period of _____ without ending _____ a preventable accident.

FOR THE COMPANY — FOR THE BUREAU OF SAFETY

INDIVIDUAL RECORD OF EMPLOYES ACCIDENTS

NAME OF EMPLOYE _____ DATE OF BIRTH _____

DATE OF EMPLOYMENT _____

NUMBER	DATE	PERSONAL INJURY	PROPERTY DAMAGE	RESPONSIBILITY RATING: VEHICLE ACCIDENT	RESPONSIBILITY RATING: EMPLOYEE INJURY	COST: CLAIM	COST: COMPANY	REMARKS

ACCIDENT RECORD CARD

WHEN AN ACCIDENT HAPPENS —

Keep cool. Don't argue. SEE THAT INJURED GETS NECESSARY FIRST AID AND MEDICAL TREATMENT. Get all information possible and fill in this card. IN CASE OF PERSONAL INJURY OR OTHER SERIOUS ACCIDENT, TELEPHONE YOUR FOREMAN AND THEN THE OFFICE. DIRECT FROM SCENE.

Date _____ Time _____

If dark, were lights lit on both vehicles _____

Place of accident _____

Auto license / Truck or / Trolley car number _____

Name on other vehicle _____

Name, address and license number of other driver, chauffeur or trolley car crew _____

Number of occupants in other vehicle or trolley _____

Names and addresses, if possible _____

Policeman (Name and shield number) _____

Was summons issued or arrest made _____

Name of injured _____ Apparent age _____

Address _____

Were injuries or damages claimed _____

Serious _____

Minor _____

Name of hospital or doctor _____

How did other person explain accident _____

Sign Here _____

IMPORTANT

Get Names of Witnesses — See Other Side

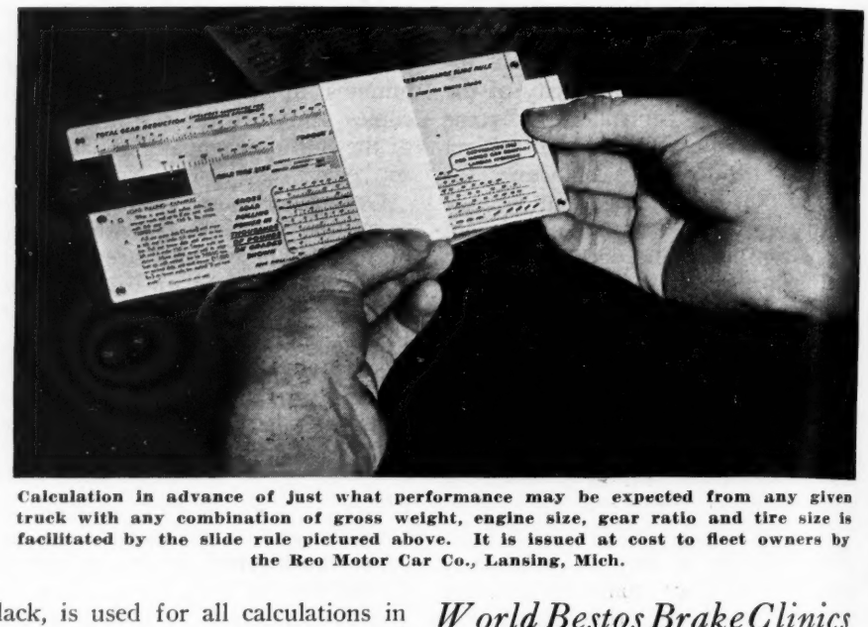
Forms used by the Borden Company safety organization. No. 1 shows the drivers accident record card. No. 2 shows the form on which the individual employee's accident record is kept. No. 3 indicates a certificate card issued to each driver who operates 3 months without a preventable accident.

Performance Important in Truck Selection

TO INSURE economy in the subsequent operation, many fleet owners in the food field are now insisting that all trucks considered for purchase shall pass satisfactorily a preliminary performance rating. The Society of Automotive Engineers has issued several preliminary formulas by means of which this rating may be determined. These formulas in detail, with full instructions on how they are to be used, may be obtained from the Society's headquarters at 29 West 39th St., New York, N. Y.

In this same connection, the Reo Motor Car Co., Lansing, Mich., has recently issued a truck performance slide rule which facilitates the calculation of truck ratings. The rule, pictured in the accompanying illustration, may be purchased at cost from Reo branches and dealers. The rule is not limited to Reo trucks but may be used for any make or model of commercial vehicle.

One side of the rule, printed in black, is used for all calculations in connection with load-pulling and grade-climbing abilities, and the reverse side, which is printed in red, is used for all speed calculations.



Calculation in advance of just what performance may be expected from any given truck with any combination of gross weight, engine size, gear ratio and tire size is facilitated by the slide rule pictured above. It is issued at cost to fleet owners by the Reo Motor Car Co., Lansing, Mich.

Review Boards Feature Armour Plant to Reduce Motor Truck Accidents

REVIEW boards feature the method employed by Armour & Co. in its accident prevention work on its motor vehicles operated throughout the United States. The company's safety work is approached from an educational standpoint. It attempts to train its men through its various activities to become better drivers, and to accomplish this end uses what is termed the review board method.

These boards are set up at each operating point. It is the duty of each board to meet monthly and review all accidents.

The procedure at these meetings, as described by F. L. Faulkner, of the automotive department, is to call in the drivers who have had accidents and interrogate them to determine the accident cause and the responsibility.

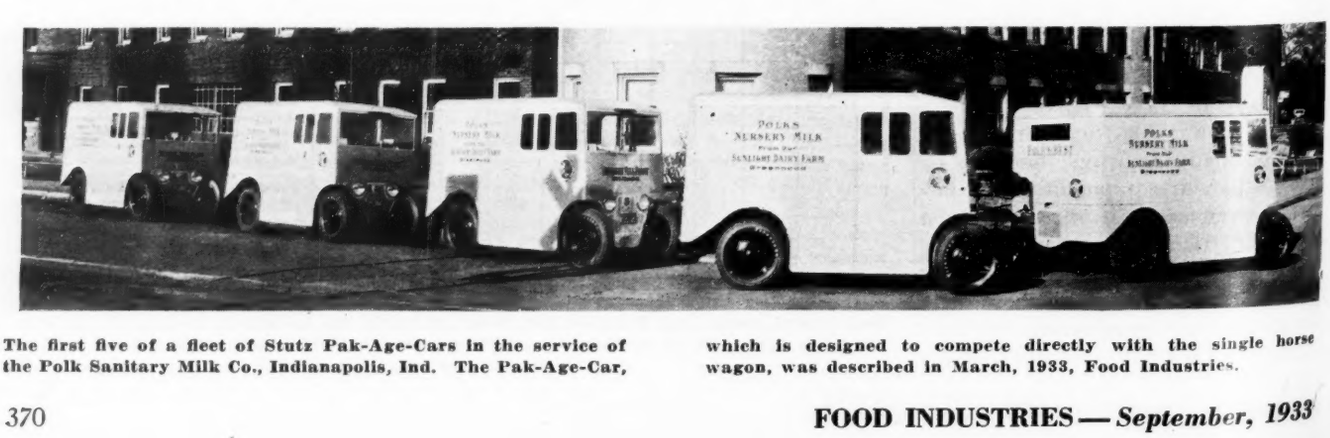
If the driver is found at fault, it is pointed out how the accident could have been avoided and a warning given. A second offense calls for a warning of dismissal while a third offense results in discharge.

World Bestos Brake Clinics

SUBSEQUENT to the article entitled "Clinics Help to Reduce Truck Brake Expenses," which appeared on page 320 of August, 1933, issue, FOOD INDUSTRIES has been advised that the World Bestos Corp., Paterson, N. J., maker of Grafild brake lining, holds brake clinics not only at its factory and in New York City but in any other territory in which fleet owners will cooperate.

No definite schedule, however, has so far been arranged for the fall season of 1933 but interested fleet superintendents will be advised of the next brake clinics in their cities if they will communicate with the company direct.

For fleet owners in the food field, the company will conduct such clinics at one of the truck operator's repair shops at which his mechanics may be present; and will provide speakers, motion pictures and working models.



The first five of a fleet of Stutz Pak-Age-Cars in the service of the Polk Sanitary Milk Co., Indianapolis, Ind. The Pak-Age-Car, which is designed to compete directly with the single horse wagon, was described in March, 1933, Food Industries.

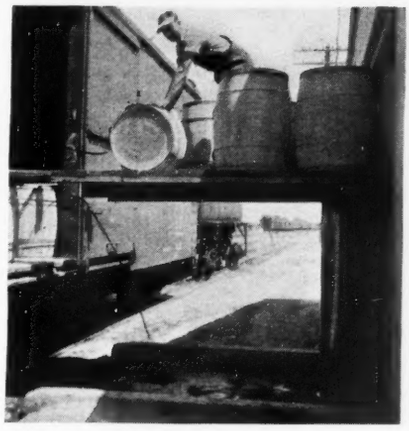
IDEAS . . . FROM PRACTICAL MEN

Lift Makes Loading Easy

In a Mid-Western milk condensery where I formerly was superintendent, a shipping platform built on a level with the ground made our loading and unloading of freight a troublesome and slow procedure. A solution of this problem dawned upon me one day while watching a lubrication service man grease my car. A lift, I decided, was just the thing we needed. Accordingly, we installed a compressed-air lift that will raise several barrels of material. This lift not only brings the load to the level of the truck or car floor but lifts it to the greater height needed in stacking the material. This feature, of course, is just as convenient in unloading.

The accompanying illustrations indicate the value of the compressed-air lift in loading a freight car with heavy barrels.

RALPH HIRSCH, *Elwood, Ind.*



Prevents Sweating of Metal

Wherever a metal object has a lower temperature than the room in which it is exposed, sweating, or condensation, occurs. This can become very objectionable, as it does, for instance, where a drain pipe serving an upper floor extends across the ceiling of a manufacturing space. Another example is the metal door between a curing or proofing room and a room of average temperature.

This condition usually is not severe enough to justify the expense of regulation cork covering or insulation, and the method suggested here is not intended in any way to take the place of wall insulation or pipe covering and the like.

In application the method is as follows: Give the surface a priming coat of paint, preferably with pure red lead. Apply a rather heavy second coat, working in sections. Immediately after applying this coat, dust the surface with granulated cork. A bellows is a convenient tool for applying the cork, and a drop cloth should be suspended around the object to save the cork that misses the surface. After the second coat with the cork imbedded in it has thoroughly dried and set, apply a finishing coat. The finish will resemble a stippled job. Where there is excessive condensation, another application of cork can be included in a third coat of paint. This, of course, necessitates a fourth finishing coat.

This method was originally used on transatlantic liners, where steel work is exposed to the cabin temperatures on one side and to that of the sea or outside air on the other side. The author has made extensive use of this idea in food factories, with highly satisfactory results.

VICTOR BUHR, *Equity Construction Co., New York, N. Y.*

Beer Under Magnifying Glass

Inspecting bottled beer for clearness as it comes from the capping machine at the rate of 55 bottles per minute requires more of the eagle eye and snap judgment than is found in the average person. By a simple arrangement, however, the task is made easy.

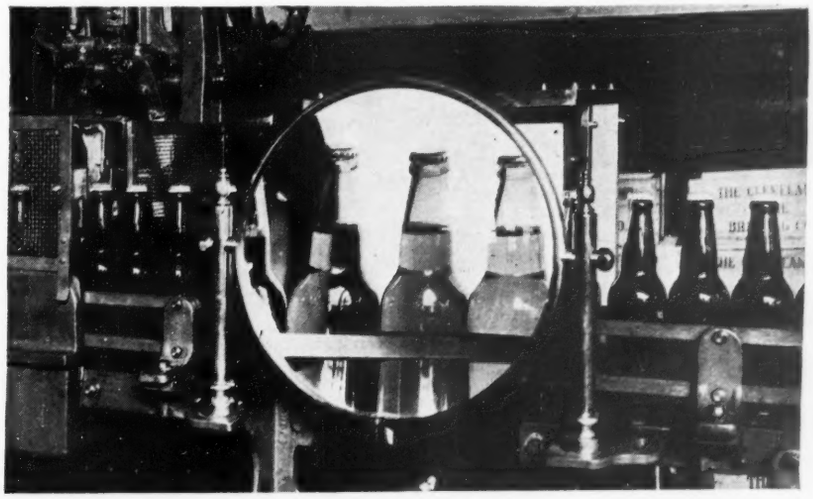
At the Cleveland Home Brewing Co., Cleveland, Ohio, the bottles pass between a light box and a magnifying glass, as shown in the illustration. The light box, located on the far side of the bottle conveyor, is equipped with three 40-watt lamps which supply sufficient illumination to obtain very clear magnification through the 14-in.-diameter magnifying glass.

LEONARD CHURCH, *Cleveland, Ohio.*

YOU HAVE AN IDEA!

Most plant men and engineers know of a way of doing something that is more efficient than the manner in which it is usually done. But often they do not realize it.

If you will "thumb" through your mental filing cabinet you probably will discover a practical idea worth money to you. You can collect from $3 to $10 for all such ideas suitable for publication in FOOD INDUSTRIES. Send them in, with sketches.



NEW PRODUCTS—

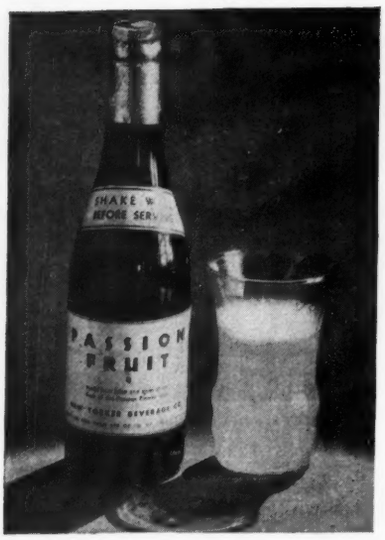
—NEW METHODS

Baked Apples in Cans

Ready-to-serve baked apples have been recently marketed by Seeman Bros., Inc., New York, N. Y., under the White Rose label. Four large-size baked apples are placed in scalloped paper cups and packed upside down in a tall can. When the top of the can is removed by a key-type opener and the can inverted, the individual apples come out, each in its own paper cup. The net weight is 1 lb. 12 oz.

New Foods by Nufoods

With the introduction of another manufacturer to the food field—Nufoods, Inc., Milwaukee, Wis.—comes the addition of three original products to the specialty meats group under the brand "Jack Sprat." Developed by the company laboratories, these packages are: a 4-lb. tin of chicken and noodle soup; a 9-oz. glass jar of pork tongue, pickled in vinegar and sliced; and a 6-oz. glass picnic jar of ham spread, cooked in champagne, ground and mixed with pickles, pimientos and spices. The ham spread and chicken and noodle dinner packages are wrapped in colored transparent cellulose. Pigs feet have been newly packaged in a 12-oz. stein holding one bottle of beer.



Passion Fruit—To Drink

Several flavors, naturally blended, impart exotic tastiness to the "passion fruit" beverage bottled by New Yorker Beverage Co., New York, N. Y. Pure juice of the fruit of the passion flower, grown for commercial use in California on a limited acreage, less than 0.1 per cent of benzoate of soda, pure cane sugar, and carbonated water are combined into a refreshing drink or a mild mixer for other drinks. It was introduced by Charles & Co., New York, N. Y.

The passion flower, a plant indigenous to North America and transplanted to South America and New Zealand, derives its name from six pistils resembling the Biblical crown of thorns. These pistils also permit the cross-pollenization which produces the blend of several flavors. The juice naturally contains pepsin.

An interesting feature of the natural fruit juice is its ability to simulate different flavors at different degrees of dilution. Expert tasters can detect five flavors coming from a single fruit.

Basic-Ash Foods

In answer to demand for a basic-ash breakfast food and a basic-ash flour, Battle Creek Food Co., Battle Creek, Mich., has introduced flakes and flour made from lima beans, one of the most highly alkaline of foods. The flakes are already in use for the treatment of nutritional disorders. They are packaged in 8-oz cartons. The lima bean flour is marketed in 16-oz. packages.

Carbonated Coffee

Coffee need no longer be "made" and cooled for use as an iced beverage, now that Cafay Dry, bottled by Canada Dry Ginger Ale, Inc., New York, N. Y., has been introduced by Charles & Co., New York grocers. Containing coffee, sugar, flavors and carbonated water, the product requires only refrigeration before serving. It is marketed in 12-oz. capped bottles.

Another Ice Cream Mix

Vanilla and chocolate ice cream can be made easily with Baker's Bexert, ready mixed powder manufactured by Baker Extract Co., Springfield, Mass. The contents of one package are dissolved in a cup of milk and mixed with an egg beater. A cup of heavy or whipping cream is added, and the mixture is beaten thoroughly. After being partially frozen in an electric refrigerator for 40 minutes, the mixture is again beaten for two minutes with an egg beater or electric mixer, and replaced in the refrigerator. It may also be made in a hand freezer. Flavors or fruits may be added to the vanilla mixture at the time of the final beating. One package makes a quart of ice cream.

Predigested Malt

Chocolate malt which dissolves as easily in cool as in warm liquid has been developed by Heyman Process Corp., New York, N. Y. The powder, labeled "Mello," contains cocoa, sugar, malt extract, malted milk and partially defatted milk. A patented process hydrolyzes the starch in raw cocoa or chocolate. The indigestible starch is changed by the diastase of the malt into digestible maltose sugar. Thus, the digestibility of the food is quickened and made easier, according to the manufacturer. The product is packed in a 1-lb. tin.

Consommé—Hot or Cold

Either hot or jellied soup can be prepared with a can of Consommé Madrilene, marketed by Seeman Bros., Inc., New York, N. Y. The liquid is made with a chicken and tomato base, coloring and gelatin. It may be jellied in the can or another receptacle in the refrigerator, and can be used in this form as salad garnish or aspic. The consommé is packed in a 13-oz. tin under the White Rose label.

Honeycomb Glass Bottle

Novel packaging has been used by W. F. Straub Laboratories, Inc., Chicago, Ill., to attract attention to Lake Shore honey and to make the package the symbol for pure honey. A rectangular glass container is designed to resemble the familiar honeycomb. It is inclosed in a cut-away cardboard carton which reveals the comb pattern, hides the bottle neck and cap, and carries the brand label, so that the illusion is complete. The design is patented, and structural patents are pending.

Ice Cream—With a Fork

Another ice cream confection has established itself as a packaged ice cream product—Brown Cow, originated and produced by Sani-Seal Co., Knoxville, Tenn. It is made by filling a multi-cavity mold with ice cream from the freezer and floating the mold through a —30 deg. F. solution of brine, circulated over ammonia coils. Before placing the molds in the brine, a rack containing an aluminum fork for each cavity is placed over the mold, the prongs extending into the ice cream. After freezing, the molds are defrosted, and the rack is lifted out with a molded bar on each fork. The bars are coated by dipping into melted Hershey's chocolate, and are inclosed in paper bags. The aluminum fork is then removed, and a Bakelite fork is placed in each package. The ice cream used in the process contains 12 per cent butter fat and 38½ per cent total solids.

Sundae in Brick Form

The packaging of ice cream products recently reached a new stage of development when Norman Confectionery Co., Denver, Colo., developed an "inside sundae." The inside of a large or small ice cream brick is hollowed out by special machinery, and the hollow is filled with fruit or other syrup of the type commonly used in making sundaes. The syrup in the center congeals sufficiently not to run, yet never freezes. Thus, each slice of the large brick as well as each small brick constitutes an "inside sundae." The small brick is marketed in a patented carton which can be folded back or torn off as the contents are eaten.

Psyllium in Cereal Wafers

It is no longer necessary to use disagreeable cathartics. Psylla wafers, developed and manufactured by Battle Creek Food Co., Battle Creek, Mich., taste good and at the same time lead to efficient elimination. They contain psyllium seed, agar, lacto-dextrin, fig and bran cereal, all whole wheat flour, milk and vegetable shortening. Resembling round oatmeal or whole wheat cookies, a dozen are packed in a cylindrical metal container, the nether part of which is sealed with transparent cellulose.

Less Starch, More Protein

Those who must eat less starch and sugar, particularly diabetics, may safely eat Proteo Bread, manufactured by Proteo Foods, Chicago, Ill., for it contains but 19 per cent of carbohydrates. Moreover, it contains proteins —found in whole wheat, soy beans, yeast and milk—which yield 40 instead of the usual 58 per cent of sugar. The 8 per cent fat content of the bread is in vegetable fat, and the 3 per cent mineral salts content is in calcium, phosphorus and iron. The bread is said to be a good source of vitamins A, B, D, G and E. The loaf, weighing about 340 grams, is sun-rayed under ultra-violet lamps, and wrapped in transparent cellulose. It may be kept safely in the refrigerator for several days.

What Food Men Are Doing

Sugar-Beet Producers Accept Quota; Officials Study Cuban Problem

Final agreement on the allotment plan of Dr. J. L. Coulter, sugar industry coordinator, seemed assured when the domestic producers of sugar beets late in August consented to limit their production to 1,750,000 tons annually for the period of the agreement. For some time the sugar-beet producers had refused to agree to a limitation of their market output. However, the quota finally allotted them exceeds the former quota by 225,000 tons.

Other producers who approved their allotments by signing the agreement were: Louisiana cane growers, 250,000 tons; Hawaii, 975,000 tons; and Puerto Rico, 875,000 tons. Cuban and Philippine representatives did not sign, because both producing areas are pleading for increased quotas, Cuba for about 2,000,000 tons and the Philippines for a quota somewhat above the 955,920 tons originally allotted. To these pleas the Farm Administration officials plan to give careful attention, in view of the difficult economic conditions in Cuba and the situation in the Philippines.

The sugar-beet producers agreed not to increase their present acreage, 1,065,000, unless the consumption demand of the United States exceeded 6,575,000 tons. Under the agreement, the Secretary of Agriculture is authorized to permit an expansion of the Eastern production area by 25,000 acres for supplying the Toledo (Ohio) and Saginaw (Mich.) factories.

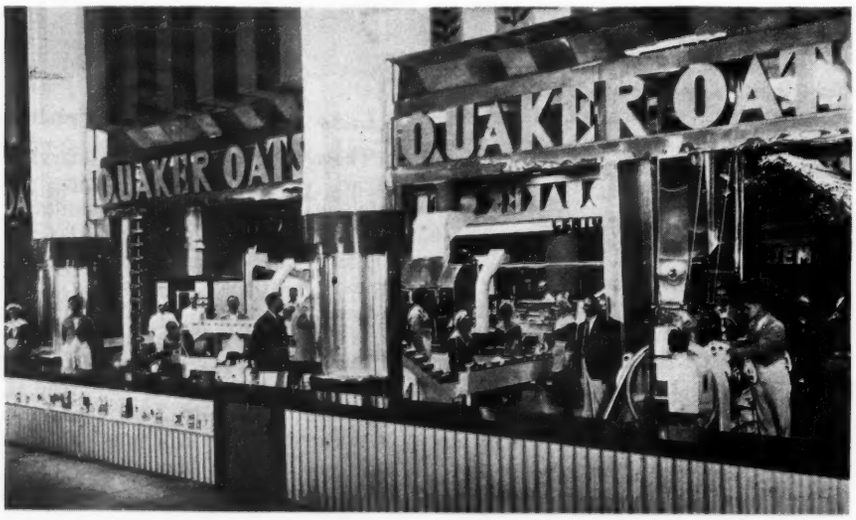
Since by law the ratification of the sugar agreement consists in the signing of it by the domestic and insular producers, excluding the Philippines, the quota agreement is now valid. Adjustment of the allotments to Cuba and the Philippines will be the work of the Administration.

James D. Dole

New Code Section Set Up; James D. Dole in Charge

To handle the deluge of fair competition codes of the many branches of the food manufacturing and distributing industries, the Agricultural Adjustment Administration has set up a separate food section. The new department is assigned to miscellaneous food products, dealing in particular with processed foods and sea foods. The new section will work hand in hand with the specialties section, headed by H. R. Tolley.

The man in charge of the new section is James D. Dole, president of Hawaiian Pineapple Co. and the "father" of the Hawaiian pineapple industry. Mr. Dole was an organizer of the Hawaiian Pineapple Growers' Association in 1908, and he is now president of the Hawaiian Bureau of Governmental Research.



Makes Groats Into Rolled Oats

In the Quaker Oats Co. exhibit at A Century of Progress is a miniature plant that turns out the famous rolled oats. Starting with groats, or oat hearts, the plant performs all the processing and packaging operations necessary to put the product on the market.

Survey in 22 Cities Proves Gouging Charges False

Charges of "gouging" made by the Secretary of Agriculture in regard to the rise in price of white bread have been disproved in 22 cities of the 39 where investigations were ordered. The average price of white bread per one-pound loaf in the 22 cities was found 1.4 cents higher on Aug. 2 than on Feb. 15 of this year, according to statistics gathered by the Bureaus of Agricultural Economics and Labor Statistics. The same data showed that the cost of ingredients in a typical one-pound loaf had increased 1.3 cents during the same period.

Many bakers in the cities in which the survey was made have increased the

weight of the loaf from 12 to 16 oz. and the price from 5 to 8 cents. This represents an increase of 1⅓ cents per pound loaf, the exact amount stipulated by Secretary Wallace as the maximum increase warranted by the rise in the price of wheat and the imposition of the wheat processing tax.

The average price of the pound loaf of white bread on Aug. 9 was 7.9 cents, and was derived from totals from chain stores, independents and retail bakers. Feb. 15 averages were used for comparison, because the lowest prices for wheat and bread were reached about that time.

The fairness of the price rises for bread in the same 22 cities was tested by a comparison of the spread between the price of wheat per bushel paid the farmer and the price of the 62 loaves made from a bushel of wheat. On Aug. 2 the spread was $3.85, including the 30-cent processing tax. With the tax deducted, the spread was found to be 2 cents less than on June 15 and only 5 cents more than last January.

Rice Millers Agree to Pay Growers Parity Price

After Southern rice growers had protested the low prices being offered them for the new crop now arriving at the mills, the growers and millers got together on the problem. An agreement was drawn up which, if approved by the A.A.A., will provide parity prices to growers for the 1933 crop. The plan drawn up at the meeting called for a marketing agreement between the Administration and the millers for the present season and a program of production control for the growers in 1934 and succeeding years. The Southern rice industry is solidly back of the plan. The millers, it is reported, have agreed virtually unanimously to present a marketing agreement guaranteeing a minimum price, equal to the parity price, for the coming season. The millers also have agreed to establish a merchandising fund by a levy of 10 cents on every barrel of rice milled. This fund would be used in making disposition of the rice surplus.

The millers have already signed their agreement and have sent it to Washington. As to production control, it will be handled in a separate agreement among the growers.

Wheat Conversion Factors

Regulations announced when the wheat processing tax was imposed have been supplemented and clarified by further regulations issued by the Secretary of Agriculture. Certain products are defined, and conversion factors for certain articles not included in the earlier regulations are fixed.

Wheat starch, bran, shorts and middlings, being exempt from the tax, have been given a conversion factor of zero. But gluten, a by-product of wheat starch, has a conversion factor of 1,173.5 The conversion factor for canned macaroni and spaghetti is reduced from 62.5 to 31.2.

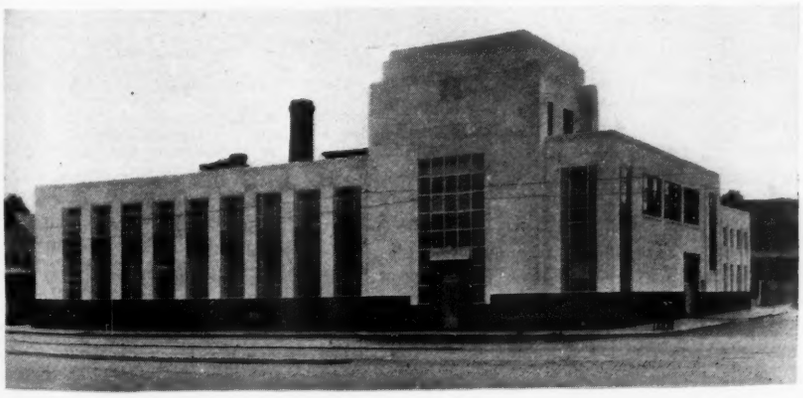
For the original Table of Conversion Factors, see FOOD INDUSTRIES for August, p. 314.

Canners of Sweet Corn To Pay Growers More

Canners of sweet corn will pay growers 25 per cent more for their products if a drive instituted by the Administration is successful. The movement was launched Aug. 21 at a conference of the canners with Charles J. Brand, co-administrator of the Agricultural Adjustment Act.

The plan for price increases provides that canners now paying less than the average for their State will increase their price up to the State average and then make a further increase of 20 per cent in cases where the State average is now $7, or more, and of 25 per cent where the State average is less than $7. Canners already paying their State average will bring their prices up to a State average plus 20 or 25 per cent, as the case may be.

This campaign will be opened in fifteen states and the Administration expects it to increase the purchasing power of the growers by approximately $750,000,000.



Not at the Fair

Although its lines suggest the ultra-modern architecture of the World's Fair, this building is not on exhibition. It houses the offices and plant of Minnesota Milk Co. and is located in St. Paul. Who wouldn't enjoy drinking milk that comes from such an attractive and sanitary building?

Hors d'Oeuvres

A MILWAUKEE brewing company proclaims to the public that it has perfected a method of controlling enzymatic activity in the brewing process, thereby preventing beer from fermenting in the stomach. We thought the public knew that the legal brewers didn't sell home-brew.

•

DR. PACINI, of Pacini Laboratories, Chicago, has revealed by marketing experiments that the public buys the most of that coffee which has the highest caffeine content. It seems that Mr. John H. Public knows what he likes, even though advertisers do tell him it isn't good.

•

"KEEPING cool with cornflakes" is the latest bit of advertising strategy introduced by Kellogg Co. Perhaps it was some pickle packer that originated the "cool as a cucumber" idea.

•

MEAT "embalmed" with sodium sulphite is being sold by small independent packers in Omaha, is the charge of the welfare board of the city. Some of the Omaha undertakers must have gone into the packing business.

•

THROUGH the Rockefeller Fund a board has been set up to study the Administration's farm relief policies. Two former Farm Board economists are engaged in the investigation. Imagine their embarrassment if the policies really are sound.

•

SIBERIANS have no use for milk bottles. Milk is frozen into bricks and a string in one corner enables the customer to throw the brick over his shoulder and walk home with it.

•

THE NOW FAMOUS Food and and Drug Act controversy between Professor Tugwell and Editor Sullen of the *Daily News*, Jackson, Miss., carries a moral. Right or wrong, editors sometimes mean what they say, and, as Mr. Tugwell will probably tell you, they aren't easily squelched.

•

A TRUCK PATCH confection, made from carrots, beets and spinach and flavored with orange juice and honey, has been produced. This may kill the slogan "Reach for a Lucky"—instead.

Devises New Method and Kiln For Curing, Smoking Fish

Ordinary kiln curing and smoking of fish have had three disadvantages: the loss of "droppers," contamination by ash, and unevenness of finish. To avoid these ill effects, the Torry station of the British Department of Scientific and Industrial Research has designed a pilot-plant kiln in the form of a tunnel which is heated by electricity to ensure control over the curing phase. The smoke is made externally in a box of special design in which the sawdust is burned at a rate governed by a small blower. The smoke is piped into the kiln through a tank, where it is cooled by water, giving up much of the liquid products of combustion.

The smoke enters the kiln nearly saturated with moisture, but the humidity of the kiln, where the smoke is heated to 85 deg. F., is normally about 50 per cent. The control within the kiln almost precludes the influences of external temperature and other atmospheric conditions. In a duct on top of the kiln are two opposed electric fans which move the smoke through the kiln at a desired rate, first in one direction and then in the other, at appropriate intervals. Both sides of the fish thus receive similar treatment.

More Funds for Market News

Funds for the Market News Service of the Bureau of Agricultural Economics, which had been entirely cut off and then partially restored, were further increased on Aug. 17. The reduction now stands at about 25 per cent, giving the service slightly less than $1,000,000, compared with the original appropriation of $1,300,000. The service on livestock and meats, fruits and vegetables and dairy and poultry products will be restored in the more important cities and the leased wire service will be extended to several points.

Explains Use of Blue Eagle

"Packers of manufactured food and other packaged products, including canned goods, will not be expected to label individual packages, but in lieu therefor must stamp or brand the N.R.A. insignia on the outside container, where the packer is entitled to its use." This statement was issued by Gen. Hugh S. Johnson on Aug. 23.

Mr. Johnson's statement continues: "In addition, every packer having the right to use the insignia should file with each wholesaler and retailer a suitable certificate that he is a member of N.R.A., which certificate will be opened to inspection to housewives and others who have signed the pledge in support of the President's re-employment agreement and furnish the retailer with shelf insignia to be displayed with their products."

CONVENTIONS

SEPTEMBER

2-9—First Beer Exposition; convention of United States Brewers' Association, Cleveland Public Auditorium, Cleveland, Ohio.

18-20—International Association of Ice Cream Manufacturers, 33d annual, Palmer House, Chicago. Robert C. Hibben, Telegraph Bldg., Harrisburg, Pa., executive secretary.

21-23—International Association of Milk Dealers, 26th annual, Palmer House, Chicago. R. H. Little, 228 LaSalle Street, Chicago, executive secretary.

21-23—Certified Milk Producers' Association, Palmer House, Chicago Harris Moak, 360 Park Place, Brooklyn, N. Y., secretary.

23-Oct. 1—Second American Exposition of Brewing Machinery, Materials and Products, Coliseum, Chicago.

24-28—Master Brewers' Association of America, Chicago. W. Eisenbeiss, secretary.

OCTOBER

2-6—National Safety Council, 22d annual, Stevens Hotel, Chicago. Henry J. Mineur, Borden Co., New York, N. Y., food session general chairman.

9—National Association of Wholesale Pie Bakers, Hotel Sherman, Chicago.

9-13—American Bottlers of Carbonated Beverages, annual, Jefferson County Armory, Louisville, Ky. Junior Owens, 726 Bond Bldg., Washington, D. C., secretary.

9-14—American Bakers' Association, annual, Hotel Sherman, Chicago. Tom Smith, 1135 Fullerton Ave., Chicago, secretary.

14-17—National Poultry, Butter and Egg Association, Hotel Sherman, Chicago.

16-18—Associated Coffee Industries, Drake Hotel, Chicago.

——Association of Pacific Fisheries Dr. E. D. Clark, 826 Skinner Bldg.,

New Plants in Texas

Construction of new citrus packing plants and additions to present plants on nine locations are now under way in the Upper Valley, Texas. The Rio Grande Valley Citrus Exchange affiliated units have three new $20,000 plants under construction and three others which are being enlarged.

The Webb Marketing Co., Mission, is extending its packing plant to house a new fruit juice plant to cost $15,000-$20,000; Lovett & Kirk are having a plant constructed at Edinburg to cost, with machinery installed, $18,000-$20,000, and the Texas Citrus Fruit Growers' Exchange will open its $50,000 San Carlos plant.

Cling Peach Canners Licensed

Licenses for California cling peach canners have been issued by Secretary Wallace, becoming effective on Aug. 17. These licenses apply not only to canners who signed the cling peach marketing agreement, approved by A.A.A., but also to those canners who did not sign.

The terms of the license are in general the same as those of the marketing agreement. This limits the total peach pack to 218,000 tons, or 10,000,000 cases, and it guarantees growers a price of $20 a ton, or the equivalent, for the entire number one crop, whether harvested or not. Funds for purchasing the surplus crop will be obtained from payment by the canners of $2.50 a ton for each ton of peaches packed.

Processing Tax Affects All

Finding that many millers do not understand that they come under the provisions of the processing tax, the Administration has issued a special statement to the trade. It explains that every miller of wheat in the United States is required to have a record as of July 9 on his unfilled contracts of flour and on all the flour he had in stock; thereafter he is to have records of his grind of wheat and of any exemption he may claim. This data will be requested by the wheat processing and marketing division of A.A.A.

Even though proper forms have not been sent them, flour millers must have exact records for the Bureau of Internal Revenue, which will collect the tax.

NRA Approves Blanket Codes

Nine food processing industries on Aug. 24, 25, 26 received approval by N.R.A. of modified blanket codes. The nine industries cover biscuits and crackers, preserves and mincemeat, pecans, tea, flavoring extracts, soda water flavors, baking powder, dry milk and milk sugar.

For the biscuit and cracker manufacturers, the maximum work week is set at 40 hours for factory workers and 48 hours for truckmen and route delivery men.

In the preserve and mincemeat industry, the code calls for a basic week of 40 hours, with not more than 48 hours in any one week. Minimum wages are 40 and 30 cents, respectively, for male and female help in the North and 35 and 25 cents in the South.

Pecan shellers have a 40-hour basic week, with not more than 48 hours for six weeks in October, November and December. The minimum wage is 20 cents an hour.

In the tea industry, the factory workers have a maximum week of 40 hours, with 10 per cent tolerance for emergency workers. Their minimum pay has been placed at 37½ cents an hour for males and 30 cents for females.

The preserve and mincemeat code and the tea code both provide that female help doing substantially the same work as male employees will receive the same pay.

The flavoring extract industry's hours are limited to 40 per week and 8 per day. Minimum wages are 40 cents an hour, unless the hourly rate on July 15, 1929, was less, and in no case is the rate to be less than 30 cents.

Soda water flavors manufacturers have been given a 40-hour week, with 8 hours a day as maximum.

In the baking powder industry, factory workers are limited to 40 hours a week and 8 hours a day, with a 10 per cent tolerance for emergency work. Male labor will receive a minimum wage of 40 cents an hour; female labor, 30 cents.

The dry milk industry established a 40-hour week, averaged over a period of two months, for employees other than factory or mechanical workers and provides that no such employee shall work more than 48 hours a week.

Employees of the milk-sugar industry have a 40-hour week, averaged over a two months period. Factory or mechanical workers have a maximum work week of 44 hours, averaged over a 12-month period. Minimum pay is 40 cents an hour.

Dairymen Ask for Embargo On Vegetable Oils

Representatives of the dairy industry on Aug. 21 asked the A.A.A. for an embargo on imports of vegetable oils and fats, maintaining that this step was the only cure for depressed conditions in the dairy industry. The dairymen further urged domestic producers of oleomargarine to purchase only fats and oils produced in the United States.

The embargo was opposed by domestic soap manufacturers, who insisted that domestic sources of oils and fats were not sufficient. Members of the oleomargarine industry opposed the limitation of their source of raw material, stating that it would put them out of business.

At the opening of the hearing in Washington, Dr. Clyde L. King, chief of the dairy section of the Agricultural Adjustment Administration, stated that the domestic dairy industry is "on the verge of a great national disaster which no one can question."

State Milk Strikes Cease Nation-Wide Prices Seen

Hostilities between producers and distributors of milk have been relieved in four sections of the country. This has been effected by arbitration and by the report that the government is studying the problem of nation-wide price-fixing.

In New York State, where a milk strike involving 40,000 dairy farmers ended on Aug. 14 after two weeks of strike conditions, Governor Lehman ordered a thorough investigation of milk prices by the State Milk Board, asking an expenditure of $25,000 for the investigation of the spread between the raw and retail price of milk. New York farm leaders have begun a state-wide organization of dairymen.

In Wisconsin, the scene recently of another difficult strike situation, representatives of the radical Milk Pool and the conservative Producers' Cooperative have met to bury the hatchet. Later meetings to which other producers' groups will be invited are planned.

Milk warfare which has continued in Houston and vicinity for nearly two years is expected to end when the report of a board of arbitration is heard by producers and distributors. As bases for a set-up to govern both groups, codes were submitted by both farmers and dealers. Warfare in Dallas and vicinity ended after several months' duration when the state department of agriculture stepped in to act as mediator. Distributors have already agreed to accept the prices fixed by the department.

Proposed milk strikes in Alabama, which would have affected the pasteurized milk supply of Birmingham, and in Connecticut were averted through arbitration. In southern Alabama, plants agreed to pay 5 per cent more to dairymen for milk to be sold in bottles only. In Connecticut, Farmers National Association accepted an agreement presented by the state Milk Board fixing prices, providing for production quotas, and stipulating the sale of surplus milk at public auction.

Brand Asks for Increase In Price of Tomatoes

Immediate response has been made by manufacturers and trade associations to the recent request of Administrator Brand to canners and processors for an increase of 25 per cent in the price of raw tomatoes. The request was made for the relief of growers, whose costs of labor and living have increased materially, while the prices of their produce under forward contracts remain fixed. The increase is requested especially of manufacturers who hold forward contracts with individual growers.

Administrator Brand, in asking for the increase, bases his request on the fact that the increase would mean approximately $2 per ton more to the grower, while it would mean an advance in cost to the canner or processor of not more than 6 or 7 per cent. The reflection of the increase in consumers' cost would be about 1 cent per can, he has stated.

The proposed increase would effect an increase in purchasing power on the part of the growers in the United States of about $2,000,000.

A number of companies have already complied with the government's request.

Precools 30 Carloads Per Day

This plant of Florida Pre-Cooling Co., Sanford, Fla., is one of the largest in the country. And it employs an entirely new system—counterflow of vegetables through water, submerged. Celery is cooled from the field temperature, about 80 deg., to 33 deg. F. Chain belt conveyors are used.

Concentrates

Disputes between employers and employees arising through different interpretations of the P.R.A. will be handled by the recently formed National Board of Arbitration, headed by Senator Robert F. Wagner . . . Every loaf of bread sold in New York City must have the weight marked on the wrapper or displayed on a sign by the seller.

Governor White of Ohio is backing a measure for a 10-cent-a-pound tax on malt . . . The increase in candy sales on cool days has been higher this season than ever before, according to H. D. Backus, president of Mary Lee Candy Co., Detroit . . . Two and a quarter million cans and 1,000 pressure cookers and sealers have been purchased by the Texas Relief and Rehabilitation Commission for the preservation of home-grown fruits and vegetables . . . Milk producers at Freedom, Ohio, have organized to turn their surplus milk into cheese . . . A campaign of advertisements indorsed by doctors, dentists and beauty parlors is bringing in new business for Detroit dairies.

Dried prunes can be canned "ready to serve" by adding lemon juice to the syrup, thus preventing spoilage and improving the flavor, according to a report of the American Chemical Society by E. F. Kohman and N. H. Sanborn, of National Canners' Association . . . Following refusal by transcontinental railroads to lower freight rates, California shippers have been sending Bartlett pears to New York by boat . . . The six weeks' creamery course offered by the University of Minnesota will be conducted from Jan. 3 to Feb. 14, 1934.

Lime growers in British West Indies propose to conduct advertising campaigns in the British and American markets to dispose of a surplus . . . A barter arrangement reported to have been concluded between Germany and Italy includes an agreement respecting rice which may have a material effect on United States exports of that product to Germany . . . British imports of frozen beef during the last quarter of this year will be cut 25 per cent . . . During the last crop year, 45 per cent of the 15 million kilograms of olive oil exported from Spain came to the United States.

MEN . . . JOBS . . . AND COMPANIES

Industry

ALLIED MILLS, INC., will rehabilitate one of its two distilleries at Peoria, Ill. D. W. McMillen has resigned as president and H. G. Atwood, chairman, will take the additional post of president. G. M. Moffett resigned as vice-president and H. D. Egly as vice-president and secretary. H. J. Buist was elected secretary and treasurer, the latter position having been vacated by J. F. Kline, who became a vice-president. J. J. Quinlan was appointed assistant treasurer and assistant secretary.

AMERICAN BAKERY, Fall River, Mass., almost entirely destroyed by fire recently, has started construction of a two-story brick building.

ANHEUSER-BUSCH, INC., plans a total expenditure of $3,000,000 during the next twelve months for plant equipment, barrels, beer cases and bottles, the greater part to be spent prior to Jan. 1, 1934.

ARMOUR & Co. stockholders will meet on Sept. 1 to ratify or reject the management's plan of recapitalization which they rejected on Aug. 22.

CAMPBELL PACKING Co. will reopen the George E. Hyde cannery at Campbell, Calif., which has been closed since 1927, to pack apricots.

C. R. CHENEY Co., of Los Angeles, subsidiary of Kraft-Phenix Cheese Corp., has purchased the assets of the Columbine Creamery Co. at Tucson and Phoenix, Ariz., and at Long Beach, Calif., at a reputed price of $50,000.

CORN PRODUCTS REFINING Co. has provided group accident and sickness insurance to 2,400 employees in plants at Argo and Pekin, Ill.; North Kansas City, Mo., and Edgewater, N. J.

FOODS, INC., recently formed company, has acquired a 51 per cent interest in Widow's Mite Corp., Geneva, N. Y. Edwin E. Taylor is president of both companies.

FRANK BROS. pepper mill opened during the past month after being closed since December, 1932.

GENERAL MILLS, INC., has completed arrangements for acquisition of Red Band Milling Co., Johnson City, Tenn., and has formed the Washburn Crosby Co. of Louisville. Richard Bean has been designated president of both new companies.

HELWIG & LEITCH CORP. has arranged to operate the new pickle plant erected at Elizabeth City, N. C., by C. Foos Co.

EDGAR P. LEWIS & SONS, INC., Boston, has purchased three factory buildings formerly owned by U. S. Rubber Co. at Malden, Mass., as a new location in the near future.

LEISY BREWERY, Cleveland, will be reopened and reequipped with an investment cost of $1,000,000, according to Herbert F. Leisy, grandson of Isaac Leisy, the founder of the business in 1862.

LIFE SAVERS, INC., will be reestablished as an independent corporation, stockholders of Drug, Inc., having voted for its dissolution into the five companies of which it is composed.

LIBBY, MCNEILL & LIBBY will rebuild and equip its Taku (Alaska) salmon cannery, destroyed by fire in 1931, at a cost of $100,000.

MIAMI BREWING & STORAGE Co. has recently installed bottling equipment costing nearly $50,000.

MIDWEST FISH PRODUCERS AND DISTRIBUTERS' ASSOCIATION has been organized with R. P. Fletcher, Booth Fisheries Corp., as president.

MOORE-LOWRY, flour millers with headquarters in Witchita, Kan., are planning to rebuild their mill in Topeka. This mill was destroyed by fire some time ago. Estimated cost is $200,000.

PACIFIC AMERICAN FISHERIES Co. cannery warehouse at Bellingham, Wash., was destroyed by fire July 27 at a loss of about $50,000.

PARK & TILFORD will reenter the choice wine and liquor business, signed contracts having designated the company as sole importers of Booth's gin and Heidsieck & Co. champagne. Remember Piper-Heidsieck?

PILLSBURY FLOUR MILLS Co. has formulated a group pension, life insurance and accident and health insurance plan for employees, the costs to be paid jointly by the company and the employees. The company is engaged in dismantling excess capacity plants at Anoka and Minneapolis, Minn.

RAINIER BREWING Co., San Francisco, has begun the construction of a malt house as an addition to its plant, which will cost $400,000. The plant will be the first in the West to control the entire beer production process on its own property.

REMAR BAKING Co. and BEST BAKING Co., Oakland, Calif., have been combined under the name Remar-Best Baking Co. with more than $1,000,000 involved.

SOUTH TEXAS LIVE STOCK PRODUCERS' ASSOCIATION, INC., will construct a meat packing plant and stockyard at Corpus Christi at a cost of $2,000,000.

SOUTHWEST DAIRY PRODUCTS Co., operating 20 milk and ice cream plants in Arkansas, Texas and Louisiana, has been declared bankrupt by the federal court at Little Rock, Ark. The company had previously been in receivership.

PERSONNEL

BERT D. BALART, formerly with S. A. Schonbrunn & Co., has formed Bert D. Balart & Associates, Inc., specializing in solving tea and coffee manufacturing and merchandising problems.

A. A. BERLE, JR., has been chosen as special legal adviser to A.A.A. in connection with sugar problems.

R. G. CLARK, who has been with Kroger Grocery & Baking Co. for twelve years, was recently made a vice-president of Piggly Wiggly Corp. He will continue to be assistant to Albert H. Morrill, president of the Kroger company.

W. P. COSGROVE has been made manager of the Memphis refinery of Cudahy Packing Co.

R. H. DONNELLY has become manager of the Cleveland branch of Libby, McNeill & Libby.

P. J. DONK is now with Associated Quality Canners, Ltd., Toronto, in charge of production. He was formerly with Snider Packing Co.

A. A. BERLE, JR.
Advises A.A.A. on Sugar Problems

GEORGE H. EARLE, an officer of Flamingo Sugar Co. and Pennsylvania Sugar Co., Philadelphia, has been appointed U. S. Minister to Austria.

E. G. GRAB, formerly technical director and research manager of National Fruit Products Co., Inc., Washington, D. C., is now manager of Food & Fruit Industries, Inc., Winchester, Va.

M. J. GRAY, Boston, was elected president of International Apple Association at the recent convention in Chicago. R. G. Phillips, Rochester, is the secretary.

JOHN A. HISE, formerly assistant manager of Western Grocer Mills, Marshalltown, Iowa, is now president of the company, succeeding S. B. Sieg, who resigned to become vice-president and general manager of the Omaha branch of Atwood Coffee Co., Minneapolis.

T. J. KIDD, Birmingham, has been appointed chairman of the margarine committee of National Cottonseed Products Association.

CLYDE L. KING, University of Pennsylvania professor of economics, was appointed chief of the dairy section of A.A.A. recently. Dr. King was milk commissioner for the Eastern States under the U. S. Food Administration in 1918-19.

HARRY KING, of King Fuller Co., Chicago, has been named president of Peanut Butter Institute.

IRENE V. KRIEG has been appointed production manager of the Michigan plant of Ivanhoe Foods, Inc.

CHAUNCEY L. LANDON, for the past six years vice-president of Canada Dry Ginger Ale Co., Inc., New York, is now vice-president in charge of marketing for J. M. Mathes, Inc., advertising agency.

PRESTON MCKINNEY, secretary of Canners' League of California, has been named managing agent of the control committee administering the cling peach marketing agreement and licensing.

ROBERT H. MONTGOMERY, formerly vice-president and general manager of Larabee Flour Mills Co., has become general sales manager of Waggoner-Gates Milling Co., Independence, Mo.

ARTHUR L. NORRIS has been elected president of Norris, Inc., to succeed the late Max M. Lowenstein.

THOMAS L. PRATT, superintendent of the East St. Louis (Ill.) plant of Swift & Co. for the past 25 years, has retired on pension at the age of 65. He had been connected with the firm for 40 years, working in Kansas City, Jersey City and Chicago.

EDWARD K. PICKETT has been elected vice-president of Washburn Crosby Co., with offices in Louisville.

JOHN J. RILEY has been designated acting secretary of Associated Bottlers of Carbonated Beverages in charge of the Washington (D. C.) office until the return of Junior Owens, national secretary, who has taken an extended vacation for his health.

V. D. SKIPWORTH, formerly vice-president and general manager of the Eastern unit of Adolf Gobel, Inc., is the new president, succeeding H. L. Batteman, who resigned in July after heading the firm since June, 1931.

PAUL S. WILLIS
Will devote full time to A.G.M.A.

HAROLD C. VOGTEL, formerly treasurer and general sales manager of H. D. Lee Flour Mills Co., Salina, Kan., is the new general sales manager of Bowersock Mills, Lawrence, Kan.

PAUL S. WILLIS, vice-president and general manager of Comet Rice Co., has been made active, full-time president of Associated Grocery Manufacturers of America. He has served as honorary president of the association for the past two years and is chairman of the grocery trade conference committee which is drafting the master code for the grocery industry. His selection as active president of the association is intended to allow him closer contact with the problems of the grocery manufacturers' group under the recovery program.

W. E. WINTERMEYER, of the Bureau of Dairy Industry, has been appointed extension dairyman for the Southern States by the U. S. Department of Agriculture. His duties will be concerned with developing and coordinating dairy extension work in twelve Southern States.

DEATHS

JOHN A. BADENOCH, vice-president and general manager of Park & Tilford from 1918 to 1924 and afterward managing director of Merrell, Soule Co., Ltd., England, died Aug. 21 at the age of 69.

CHARLES R. BOWMAN, president of Fairfield Western Maryland Dairy, died Aug. 28 following an operation for peritonitis. Mr. Bowman was head of the Fairfield Farms Dairy, which merged with Western Maryland Dairy in 1928.

CHARLES R. FOSTER, vice-president of Foote & Jenks, Inc., flavor specailists, Jackson, Mich., was killed in an automobile accident July 31. He had been with Foote & Jenks for 33 years.

J. H. HARRIS, president of the Elkhorn Canning Co., Elkhorn, Wis., died recently at the age of 76.

A. H. IVES, founder of Ives Ice Cream Co., Minneapolis, and a former member of the board of directors of International Association of Ice Cream Manufacturers, died recently.

JOHN THOMAS LUPTON, part owner of the Coca-Cola Bottling Co., Chattanooga, and one of the organizers of the first Coca-Cola Co., died recently following an operation for appendicitis. He was 71.

JAMES L. MCQUEENY, general manager and a director of Loose-Wiles Biscuit Co. at Kansas City, died Aug. 24 at the age of 60. He joined Loose-Wiles in 1904, becoming general manager in 1915.

RUDOLPH MUNZ, New Jersey bottler who helped to organize the New Jersey Bottlers' Protective Association and who served as its president for several years, died Aug. 12 of heart attack. Mr. Munz was born in Germany 57 years ago.

SAMUEL T. PYPER, executive secretary of the Ohio Valley unit of National Dairy Council and formerly chief food inspector of the health department in Cincinnati, died at his home in that city Aug. 10. He was 47.

WILLIAM J. REUTER, 53, president of Red Circle Candy Co., Milwaukee, and former secretary-treasurer of Princess Candy Co., died recently.

F. A. RUENITZ, recently retired president of the Springfield (Minn.) Milling Co., died at his home on July 29 of cerebral hemorrhage. He was 50.

Associated Industries

COMBUSTION ENGINEERING CO., INC., New York, a newly organized company, took over, on Aug. 1, the properties of International Combustioin Engineering Corp. and affiliated companies. The company will continue the Combustion Engineering line of equipment.

CONTINENTAL CAN CO., INC., New York, has acquired the can manufacturing business of Manion Steel Barrel Co., Rouseville, Pa., a division of the Rouseville Cooperage Co.

MASON REGULATOR CO., Boston, and its subsidiary, Neilan Co., Ltd., Los Angeles, have consolidated, adopting the name Mason-Neilan Regulator Co. F. Kenneth Morrison, former sales manager for the Mason company, will continue in this position for the new concern.

H. B. VOLLRATH, for fourteen years sales engineer for Baker Perkins Co. in the Eastern territory, has resigned to go with Sylvania Industrial Corp. at Fredericksburg, Va.

BUSINESS TRENDS

Canners' Stocks Decrease

Comparisons of canners' stocks of seven principal canned foods indicate a marked decrease in the first six months of 1933 from the stocks on hand on July 1, 1932, the Bureau of Foreign and Domestic Commerce reports. The greatest decreases were shown in corn, peas, pineapple and peaches, the percentages ranging from 53 to 79.

Stocks of the same seven canned foods in the hands of 440 distributors showed increases over stocks as of July 1, 1932, of 1.7 per cent for tomatoes and 95.4 per cent for peaches, and decreases in the other foods.

Fewer Lambs Forecast

Supplies of lambs for market during the next ten months are somewhat smaller than a year earlier, and an improvement in consumer demand for lamb is expected with the increase in industrial activity, according to the Bureau of Agricultural Economics.

Sheep numbers are now on the downtrend after having reached the peak in 1932, following a period of nine years in which they increased more than 45 per cent.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

Prices Recovering

Speculative interests anticipating a cheapening of the dollar aided by drought conditions have turned commodity prices upward again.

Confusion resulting from dollar instability and from attempts to interpret and to put into effect the terms of the "Blanket Code," the N.I.R.A. and the A.A.A. has had a slowing up effect on general business activity since the third week in July; the first definite turn downward since March 15.

The Business Week Index of business activity stands at 64.8 per cent of normal for the week ending Aug. 19, as compared with 69.1 for the week ending July 15.

Average wholesale prices reported by U. S. Department of Labor as of Aug. 12 still reflected the collapse in the commodity market. Prices of all commodities had risen only 0.72 per cent in the month. Farm products were 4.25 per cent cheaper and food prices were 1.51 per cent lower.

A recovery upturn during the week of Aug. 14 is indicated in the weighted index of prices of the *Journal of Commerce*, New York. All commodities for the month ending Aug. 19 had a net gain in price of 1.02 per cent; grain of 1.72 per cent; food of 1.5 per cent.

A. & P. tonnage sales for July were 3.7 per cent lower than for July, 1932, and 24.56 per cent lower than for June, 1933.

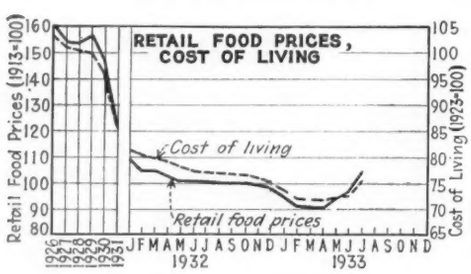
Food Companies Cut Hours, Raise Pay, Add Help

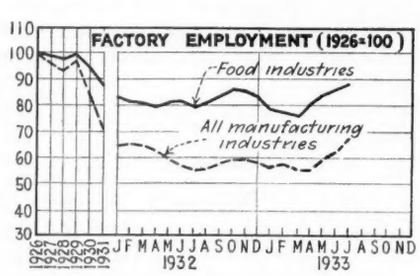
Food companies throughout the country are adopting the Blue Eagle. Working hours are being reduced and minimum wages and salaries boosted. President C. M. Chester of General Foods, Inc., signed some 50 codes as his organization and its subsidiaries accepted the President's Re-employment Agreement. Two other large companies, Libby, McNeill & Libby and H. J. Heinz Co., have gone under the N.R.A.

In St. Louis, Ralston Purina Co. has placed its workers on a 40-hour week with rates of pay in most instances above the limit set by the code. Two other St. Louis companies, Corno Mills and National Candy Co., are adopting higher wages and shorter hours. Several food companies in Chicago, including Swift & Co., Curtiss Candy Co., Kraft-Phenix Cheese Corp. and General Candy Co., have accepted the Blue Eagle.

Chicopee Provision Co., Inc., Chicopee, Mass., has raised wages from 10 to 15 per cent, at the same time adopting the 40-hour week and adding help. Employees of Rockwood & Co., Brooklyn, N. Y., have been drawing 5 per cent larger pay envelopes since late in July.

Unofficial estimates from Nebraska place the increase in the payrolls of the State's packing industry at three-quarters of a million dollars, and two of the


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Cost of living
Retail food prices
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


FACTORY EMPLOYMENT (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
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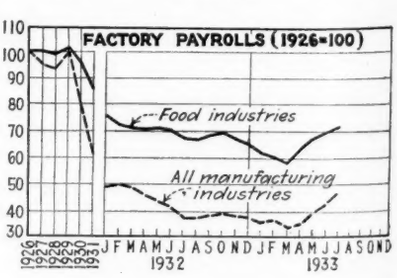
FACTORY PAYROLLS (1926=100)
Food industries
All manufacturing industries
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J F M A M J J A S O N D J F M A M J J A S O N D
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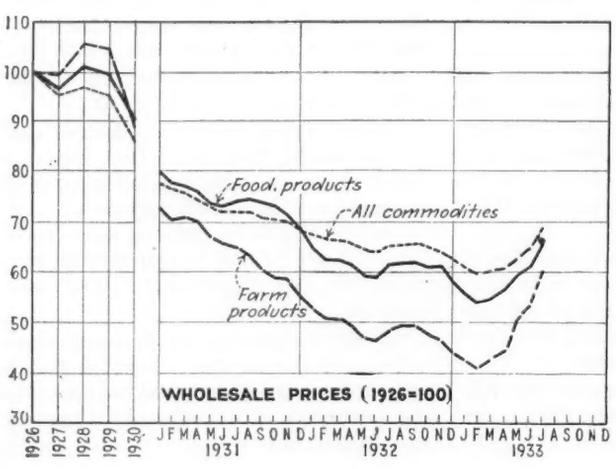
Food products
All commodities
Farm products
WHOLESALE PRICES (1926=100)
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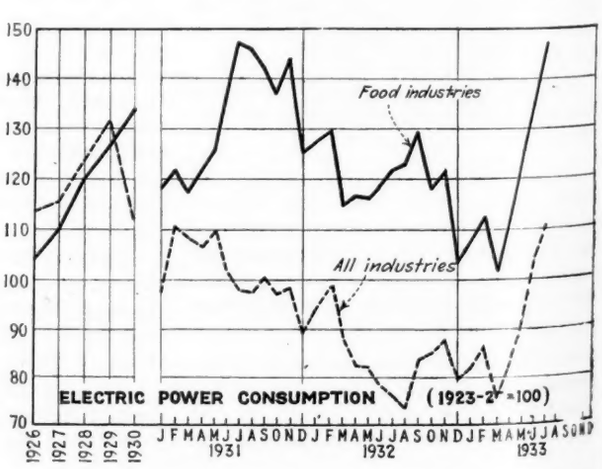

Food industries
All industries
ELECTRIC POWER CONSUMPTION (1923-25=100)
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932
1933

largest creameries in Omaha will add $100,000 each to their payrolls, by employing more people at shorter hours, it is estimated.

Southern California's largest bakery, Weber Baking Co., Los Angeles, pledged support of N.R.A. following the President's radio appeal late in July.

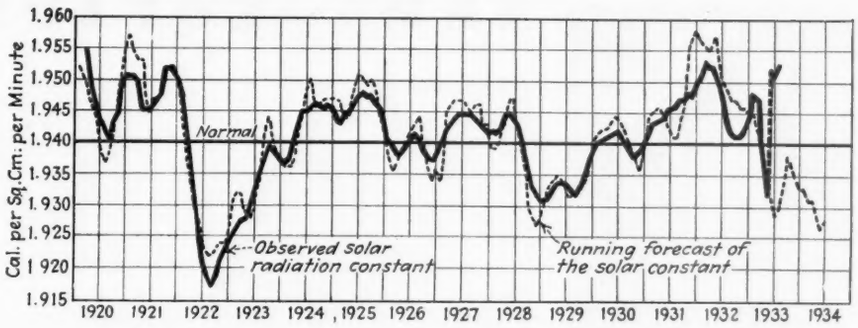
Williamson Candy Co. has announced that 200 workers will be added at the Brooklyn plant. Amalgamated Sugar Co. has voted a pay increase to 500 employees, paying 35 cents an hour to unskilled workers and bringing the rate back to 1929 levels. H. J. Heinz Co. increased its payroll 34.8 per cent at the Pittsburgh plant.

Upward Trend in Cow Numbers Probably Will Cease

With the rapid rise in feed grain prices, with poor pasture and with a sharp increase in the slaughter of cows and heifers, the upward trend in the number of milk cows on farms, which began in 1928, may cease, says the Bureau of Agricultural Economics. Moreover, prices for dairy products are expected to follow the rise taken by other commodities.

Production of milk and manufactured dairy products for the first half of 1933 was practically equal to that for the same period of last year, but storage stocks of butter and cheese were well above normal on July 1.

It also has been pointed out by the bureau that dairy products abroad have not had price rises comparable to those in this country and that differences in the price of butter between home and the leading foreign markets are unusually wide for this time of year.



Solar Radiation High in July

Preliminary figures, not shown in the curve, indicate that the solar constant of radiation stood at 1.946 for the first ten days of August. The average for the entire month of July was 1.953.

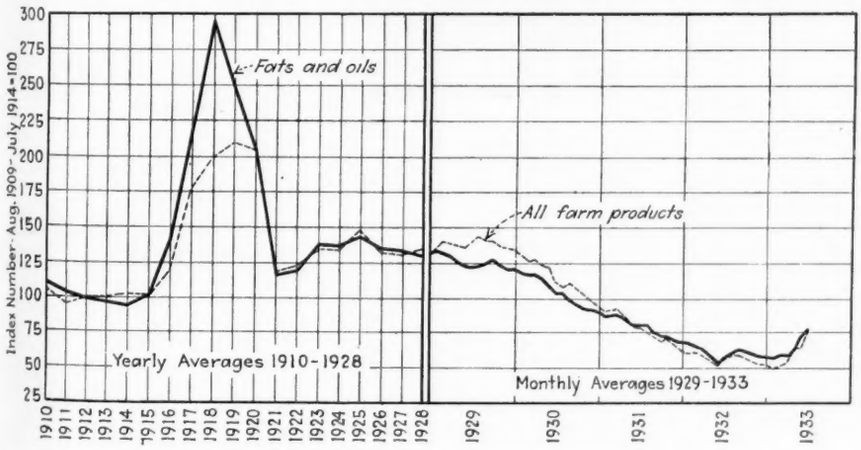
The current curve of the monthly mean is, however, shown as a dotted line to indicate that Smithsonian Institution regards them as tentative values until they are verified.

Recent monthly means follow:

February	1.947	May	1.952
March	1.940	June	1.951
April	1.932	July	1.953

Price Index Trends of Fats and Oils—1910-33

Prepared by Bureau of Raw Materials for American Vegetable Oils and Fats Industries



CONSTRUCTION NEWS

	Proposed Construction Pending	Contracts Awarded August	Contracts Awarded Cumulative 1933 No. Awards	Contracts Awarded Cumulative 1933 Total
Bakery Products	$56,000	.....	18	$420,000
Beverage	5,650,000	$3,526,000	74	8,049,000
Canning and Preserving	65,000	58,000	8	251,000
Confectionery	.....	.....	...	.....
Grain Mill Products	25,000	185,000	15	1,094,000
Ice Manufactured	980,000	.....	5	256,000
Meats and Meat Products	66,000	.....	6	366,000
Milk Products	268,000	15,000	26	860,000
Sugar	.....	.....	...	.....
Miscellaneous	150,000	323,000	15	950,000
Total	$7,260,000	$4,107,000	167	$12,246,000

INDICATORS

CONSUMPTION of food fish in the United States increased from 15 to 18 lb. per capita, annually, during the period from 1908 to 1930. Consumption of the meat of land animals was 150 lb. per capita in 1908 and 132 lb. in 1930.

THE WHEAT carryover of the United States for this year is the largest in the country's history, 385,881,000 bu. as of July 1, according to a government estimate announced Aug. 11.

SOUTHERN cotton planters are planting quick-growing clover and late corn on land released by plowing under cotton to effect the acreage reduction. Both crops are for feeds, which means that the Northern farmer will help pay for cotton curtailment through loss of a market for hay.

THIS YEAR'S rice supply will be off by 16 per cent, totaling 8,824,900 bbl., according to American Rice Growers' Cooperative Association. . . . Louisiana State Rice Milling Co., world's largest rice miller, has raised prices to growers, best quality bringing $3.

DECENTRALIZATION of industry in connection with the Tennessee Valley project probably will permit factory workers to produce most of their own food. Shorter hours with more time in the garden are in prospect.

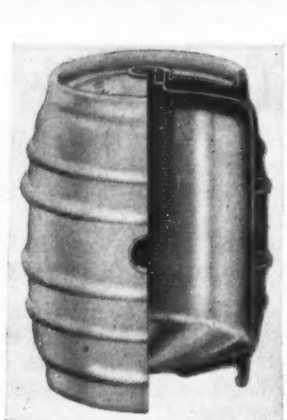
AFTER spending three years in clearing nearly 1,000 acres for farming and garden projects, the 1,600 miners of Alabama Fuel & Iron Co. were able to produce their own food last year. They averaged about two days a week in the mines and the rest in the garden.

WITH Empire self-sufficiency as the purpose, two chartered companies are developing vast tracts of land in northern Australia.

NEW • EQUIPMENT • FOR

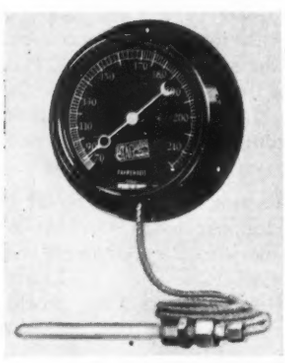
Platform Scale

Extreme loads may be placed on the edges of a platform of the new portable platform scale developed by Kron Co., Bridgeport, Conn., without affecting the accuracy of the scale, the manufacturer states. The platform is so designed that the platform plate does not overhang the suspension loops. The scale incorporates the standard Kron ball-bearing one-cam translation mechanism and the levers of the scale have no lateral movement. The scale is built with the platform 21x29 in.; and the standard unit has four-wheel construction, the wheels being made of a combination of Bakelite and rubber. The Kron scale is of the dial type.



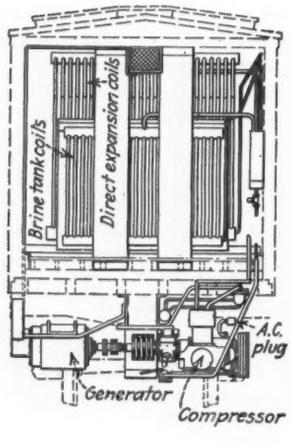
Double-Shell Steel Beer Barrel

Through an agreement with Krupp Works, Germany, Ingersoll Steel & Disc Co., Chicago, is manufacturing a double-shell, insulated steel beer barrel of the Krupp design. The outer shell of this barrel is of heavy-gage deep-drawing steel, and the exterior of the barrel is bonderized and bake enameled. The inner shell may be either of bonderized steel or stainless steel. Bonderizing is a special rust-resistant treatment applied to deep-drawing steel. This is said to enable the sprayed pitch to adhere much better than if the interior were of bare metal. The stainless steel lining requires no pitching at all. The inner shell of the Krupp-Ingersoll barrel is insulated from the outer shell at the points of support.



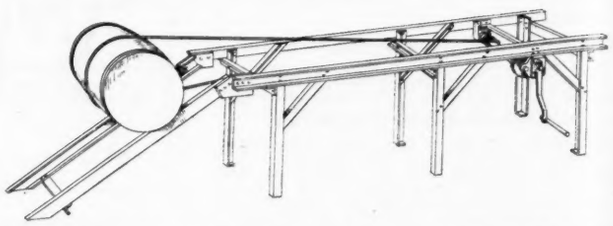
Dial Thermometer

Temperatures may be read easily and accurately on the 5-in. dial indicating thermometers manufactured by C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y. This instrument was developed as a moderately priced dial thermometer that will stand up under severe operating conditions. Its actuating element is a bronze bellows which expands and contracts with changes in the temperature of the bulb. The motion of the bellows is transmitted directly to the pointer by a new vibration-proof connecting mechanism. A black Bakelite case houses the mechanism and provides a striking contrast for the white numerals of the dial. Temperatures between —40 and +335 deg. F. fall within the range of the instrument.



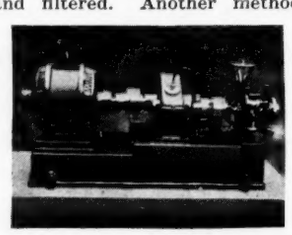
New Frigicar

With two years of commercial operation as a background, North American Car Corp., New York, N. Y., has brought out a new model Frigicar. The electrically driven, mechanical refrigerating system in this railroad car receives power from one of the axles, a special belt-tension device taking care of changes in the relative positions of the car truck and car body. The tension device drives a d.c. generator through a flexible shaft, the generator supplying power to operate an a.c.-d.c. motor which drives a twin cylinder, single-acting, vertical, reciprocating ice machine. When precooling or for standby service, the a.c. motor is operated. Temperatures in the car are automatically controlled by electrically operated, bimetallic thermostats. The direct-expansion coils of the cooling system are located at the extreme ends of the car, and the brine tanks are set under and in front of these coils. There are two brine tanks and coils at each end. North American Car Corp. is now offering the half-size refrigerator car, announced about six months ago and since subjected to practical tests.



Process Introduces Vitamins in Beer

Vitamins contained in the yeast used in brewing beer can be retained in the beverage by a process announced by Vitamin-Lux Process American Agency, Inc., 2 Stone St., New York, N. Y. The process involves the use of a colloid machine which ruptures the yeast cells and extracts the "cell sap" containing the vitamins of the yeast. Yeast may be treated in this manner after being taken out of the fermenting pot, the vitamin extracts being added to the beer after the yeast is processed and filtered. Another method



of introducing the vitamin is to add the Lux-treated yeast in the aging process. The colloid machine used in treating the yeast is driven by a 1½- or 2-hp. electric motor, and it is water-cooled. Several advantages have been attributed to the Lux process. By use of the treated yeast in the after-fermenting stage, the ripening of the beer is said to be shortened by three or four weeks. The process is also said to improve the taste of the beverage, make it more digestible and give it a lighter color, more like original Pilsener. The process was developed in Germany and is reported to have been adopted by several leading German brewers.

Drains Drums Easily

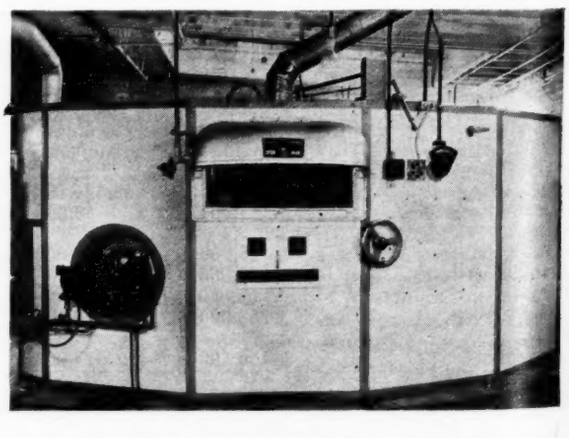
One operator can easily raise a row of barrels or drums to the proper height for draining with an inexpensive rack manufactured by Lewis-Shepard Co., 125 Walnut St., Watertown Station, Boston, Mass. The containers are rolled up an incline onto the rack by means of a cable and winch attachment. Built of angle iron, the racks are 24 in. high and come in capacities of from 4 to 12 drums.

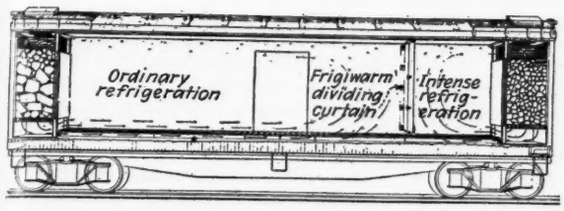
Automatic Milk Bottle Washer

One man may operate the automatic Standard Four milk-bottle washer produced by Sturdy-Bilt Equipment Corp., 227 East Lincoln Ave., Milwaukee, Wis. The washing involves five separate processes which clean the bottles inside and out and require from eight to ten minutes. The processes include pressure pre-rinsing, hot caustic soaking, inside and outside caustic washing, positive washing and a fresh-water rinsing. The bottles leave the machine ready for filling, having been cooled. The standard washer is 11x2x4 ft., and handles 24 bottles per minute. A larger size, equipped with an automatic loader and unloader, handles 34 bottles per minute.

Oven Has Closed Duct System

No products of combustion can get into the baking chamber of the new diathermatic rotary oven announced by Baker Perkins Co., Inc., Saginaw, Mich. The hot gases circulate through a closed system of ducts and radiators moving at high velocity. A small motor-driven fan maintains circulation, drawing air in for combustion and exhausting an equivalent quantity. The flow of gases may be apportioned as desired between the separate top and bottom radiators. The entire system operates under negative pressure. Fuel may be either gas or oil. The oven is available in two sizes, 14 and 16 ft.





Frigiwarm Curtains for Cooled Cars

Refrigerator cars may be divided into two sections, with different temperatures in each section, by the "Frigiwarm" car dividing curtains, developed by Red Head Brand Co., 925 West Chicago Ave., Chicago, Ill. These curtains may also be used vestibule fashion, one pair on each side of the car doorway, when it is necessary to open doors on both sides of the car. The company also manufactures curtains with transparent cellulose windows for covering the doors of freight cars during loading and unloading operations. These may be of the split type or they may be had with a flap near the floor that raises to permit boxes to be passed through or to accommodate a conveyor. Use of the curtains is held to effect substantial saving in ice and to maintain uniform car temperatures.

Starch Conditioning System

Flexibility and simplicity are incorporated in a starch-conditioning system recently announced by Wolf Co., Chambersburg, Pa. Each conditioning cylinder has an individual steam inlet or water inlet on a manifold, and temperatures can be regulated accordingly. Air circulation through the cylinders is controllable, so the dryness of the starch can be regulated as desired. This conditioning system will handle all the starch from a mogul in a continuous flow line and will sift it all through a 60-mesh screen. Moisture content can be regulated as low as 3 per cent and temperatures can be varied anywhere from 90 to 160 deg. F. Low steam pressure is used to accomplish this. The cylinders of the conditioner are jacketed from end to end and are covered with asbestos.

Spray Nozzle Gives Flat Stream

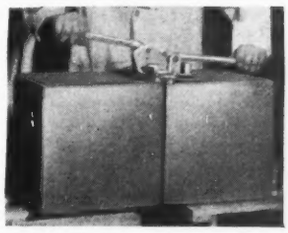
Originally produced to clean the baskets of traveling water screens in power plants, the Rex spray nozzle manufactured by Chain Belt Co., Milwaukee, Wis., has many food plant uses. Its design causes a round stream to strike a curved deflector plate with retaining sides, thus producing a flat spray, free from mist. It is made in two sizes, the larger having a $\frac{11}{16}$-in. throat at the discharge point and a $4\frac{1}{2}$-in. length over all. The smaller nozzle has a $\frac{1}{4}$-in. throat and is $2\frac{1}{2}$ in. long. The nozzle may be used for cleaning sugar beets and milk-bottle caps, for spraying bagasse on intermediate carriers in cane-sugar mills, for cleaning carcasses in the killing rooms of packing plants and for cleaning the plant and equipment.

Small, Accurate Indicator

To satisfy a demand for a small, moderate-priced indicating gage of guaranteed accuracy and with a 270-deg. scale, Foxboro Co., Foxboro, Mass., is offering its model "DH" instrument. The gage is equipped with a full length Bourdon spring, used to reduce movement multiplication and to increase accuracy. The instrument is guaranteed to be accurate within 1 per cent of its total scale. It is furnished in a drawn brass case and ring with buffed nickel, buffed brass or chromium finish. Any range from 0-15 lb. per square inch to 0-300 lb. per square inch, as well as 0-30 in. of mercury vacuum, is available.

Meat Shipping Box

Developed primarily for shipment of fresh and smoked meats, a container announced by Dexter Folder Co., 28 West 23d St., New York, N. Y., incorporates several new features. The box is constructed of wood placed between two layers of fiber, affording rigidity and strength. Wooden cleats reinforce the ends and wooden strips on alternate sides of the closing flaps interlock to provide a strong closure. The box is set up from three parts, the body sheet and two end pieces with the closing flaps attached. The body sheet is stitched to the ends, and to close the container, the flaps are fastened down with a steel strap. The box carries up to 140 lb. gross weight and can be stacked 8 to 10 high.

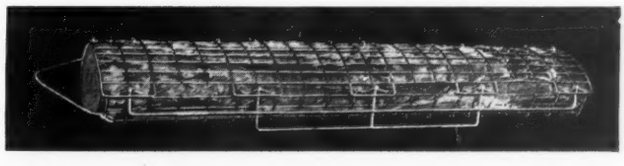


Improved Sandpaper

Sandpaper and other coated abrasives used in the food industries for such purposes as cleaning milk stone from condensed-milk equipment, and also largely employed in plant maintenance work, have been improved by a new manufacturing process. With the new method, which is used by a group of leading manufacturers, the abrasive grains are propelled into the adhesive on the surface of the backing material by an electrostatic field. This field polarizes the grains so that they are embedded point up. The method also gives an even dispersion of the particles. Tests indicate that the process increases the service of the product by 30 to 40 per cent, on the average. The improved sandpapers became available on Sept. 1.

Mold for Bacon

Pork loins may be molded into uniformly shaped Canadian style bacon with the wire form announced by United Steel & Wire Co., Battle Creek, Mich., the loins being placed in the forms before smoking. The molds are supplied in three sizes, $3\frac{1}{2}$x$1\frac{3}{4}$x 20 in.; $3\frac{3}{4}$x$1\frac{3}{4}$x25 in.; and $4\frac{1}{4}$x $1\frac{3}{4}$x25 in. They are made from basic steel wire welded at each joint and subjected to a 100-per cent tin solution after fabrication. A patented closing device is said to permit instant opening or closing of the forms.



The Manufacturers ••Offer••

Mold and Rope—Ways and means of controlling mold and rope in the bakery are told in a 16-page illustrated booklet by Mathieson Alkali Works, Inc., 250 Park Ave., New York, N. Y.

Salt—The history, refining and uses of salt are set forth in an 86-page, carefully illustrated booklet by Worcester Salt Co., New York, N. Y.

Scopometry—Devices for making colorimetric and turbidimetric determinations are described and illustrated in a 4-page folder by Bausch & Lomb Optical Co., Rochester, N. Y.

Traps — The 15-page Armstrong Trap Magazine for May-June, by Armstrong Machine Works, Three Rivers, Mich., contains an article titled "How Packing Industry Can Save $14,000,000 a year."

Ice Cream—Vogt-process, unit portion ice cream is described in a 28-page illustrated booklet by Vogt Processes, Inc., Louisville, Ky.

Rubber Tires—A 7-page folder by B. F. Goodrich Co., Akron, Ohio, outlines the merits of rubber tires on trucks used in industrial plants and warehouses.

Mill Machinery — Crushers, grinders and pulverizers are discussed and illustrated in a 24-page bulletin, No. 36-C, by Robinson Manufacturing Co., Muncy, Pa.

Lactol—The advantages to the baker who uses Lactol are outlined in an 11-page booklet by Nulomoline Co., 111 Wall St., New York, N. Y.

Brewery Equipment — Vilter Manufacturing Co., Milwaukee, Wis., in a 15-page illustrated catalog offers refrigerating machinery and equipment for a modern brewery.

Hygrometers — Direct-reading precision instruments for determining true air conditions are described in an illustrated leaf by Amthor Testing Instrument Co., Inc., 309 Johnson St., Brooklyn, N. Y.

Motors — Long-hour-duty, split-phase motors are described and illustrated in Bulletin 167 by Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.

Chocolate Coatings—Questions and answers concerning chocolate coatings constitute the 12-page booklet "What About Chocolate Coatings?" by American Lecithin Corp., 11 West 42d St., New York, N. Y.

Bread — Advantages of rye bread made with Tricol are pointed out in a 2-page folder, "Making Profits With Variety Breads," by American Molasses Co., 14 Wall St., New York, N. Y.

Industrial Design — A nine-page brochure by Haines, Spencer & Chancellor, Inc., 342 Madison Ave., New York, N. Y., introduces about a dozen industrial designers, each with a special line and style.

Steam Traps—A 4-page illustrated bulletin, No. 833, by W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa., discusses the Nicholson industrial trap and lists its applications.

HCN Fumigation—Control of insects infesting raw and manufactured products is discussed in a 23-page booklet by E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

Acid-Proofing — Protection from acid corrosion through the use of Porox is the subject of a 3-page pamphlet by Patterson Foundry & Machine Co., East Liverpool, Ohio.

Text of Proposed Grocery Master Code

(Concluded from page 368)

in closing out in good faith the owner's stock or any part thereof for the purpose of discontinuing his trade in any stock or commodity, or in disposing of seasonal or damaged goods and merchandise requiring immediate movement into consumption to prevent loss.

(4) Provided further that where no intermediate wholesaler is involved the dealer at retail shall add not less than the combined wholesale and retail minimum mark-up.

Article V—Uneconomic and Unfair Trade Practices Prohibited

Sec. 1. No grocery manufacturer or wholesale grocer shall offer or make a quantity price unless it is a genuine quantity price. The term "genuine quantity price," as used in this section, means a price differential which is reasonably based upon and measured by a substantial difference in the quantity sold and delivered.

Sec. 2. No grocery manufacturer or wholesale grocer shall allow, and no wholesale or retail grocer shall take, a cash discount which is not earned by payment in accord with the published cash discount terms.

Sec. 3. (1) No grocery manufacturer or wholesale grocer or food broker or any seller's representative shall give to a trade buyer, and no trade buyer shall accept, any part of any commission or compensation paid for sales service rendered. Nor shall it be permissible for any one rendering brokerage or sales service to split commission or compensation paid therefor with the buyer.

(2) Regular commission or compensation for sales service rendered *(a)* shall be paid in its entirety to the food broker or representative selected by the manufacturer or seller and rendering such service for him and *(b)* shall not be diverted or used in any part to affect the cost of merchandise to a trade buyer. Upon request of the Food and Grocery Conference Committee, or any member thereof, a grocery manufacturer shall disclose his said selected food brokers or representatives.

Sec. 4. No grocery manufacturer or wholesale grocer shall pay a trade buyer, and no trade buyer shall request a grocery manufacturer or wholesale grocer to pay for a special advertising or distribution service by such buyer *(a)* except in pursuance of a written contract made in good faith and explicitly defining the service to be rendered and the payment for it; *(b)* unless such service is duly rendered and such payment is reasonable and not excessive in amount; *(c)* unless such payment is entirely separate and distinct from the sales price and not used to reduce that price; and *(d)* unless such payment is equally available to all competitive buyers in the same trade area under like conditions.

Sec. 5. (1) No grocery manufacturer or wholesale or retail grocer shall offer or give, and no wholesale or retail grocer shall request or accept, a free deal. The term "free deal," as used in this paragraph, means the gift of a product or any special deal discount (other than a regular quantity discount) or allowance to a trade buyer or consumer conditioned upon the purchase of a product.

(2) No grocery manufacturer or wholesale or retail grocer shall require a buyer to purchase one product in order to purchase another.

(3) No grocery manufacturer or wholesale or retail grocer shall offer any prize or premium or gift to either a trade or a consumer buyer in pursuance of a plan *(a)* which involves fraud or deception or lottery or *(b)* which is, because of any other injurious abuse, detrimental to the trade or consuming public.

(4) No grocery manufacturer or wholesale or retail grocer shall engage in commercial bribery. The term "commercial bribery," as used in this paragraph, means the making of any payment or gift (through a redeemable token or otherwise) to an employee or other representative of a trade buyer or seller, actual or prospective, to secure a business advantage or preference. It makes no difference whether this is done with or without the knowledge or consent of such buyer or seller.

Sec. 6. No grocery manufacturer or wholesale grocer shall pursue the practice of shipment upon consignment to a trade buyer, except to the extent permitted and announced by the Food and Grocery Conference Committee.

Sec. 7. No one in the food and grocery industry shall either *(a)* refuse to fill a genuine order duly accepted by him or *(b)* refuse to accept the due delivery of a genuine order given by him or *(c)* deliberately substitute another product for that ordered from him, in the normal course of his business.

Sec. 8. (1) No one in the food and grocery industry shall either *(a)* quote a fictitious price or *(b)* invoice a false price or *(c)* make any price statement or representation or claim which is effective to mislead or deceive the purchaser or to unfairly injure a competitor.

(2) No one in the food and grocery industry shall use a false or deceptive label upon his product or a deceptively shaped or filled container for his product.

(3) No one in the food and grocery industry shall make or use any false or misleading advertisement of any kind through any medium, or otherwise deceive the purchasing public.

(4) No one in the food and grocery industry shall defame a competitor by uttering false and disparaging statements about him or his merchandise, or his business or shall unfairly interfere with his business by misappropriating it in any respect or by unfairly enticing away his employees or by inducing a breach of his contracts, or by any other means.

Article VI—Administration and Enforcement

Sec. 1. (1) The food and grocery industry hereby appoints the Food and Grocery Conference Committee to administer this code, for and in behalf of the industry. The committee shall justly and equally represent the broad and distinct divisions of the industry and therefore shall include in its membership representatives of the following divisions, namely, manufacturer, broker, wholesaler, individual retailer, corporate chain, voluntary groups, and retailer-owned wholesaler. The membership and action of the committee shall be at all times subject to the approval of the President of the United States or his designated representatives in the circumstance.

(2) Such committee shall be empowered *(a)* to interpret the practical meaning and application of this code, for the information of the industry; *(b)* to receive, hear and investigate complaints of violation of this code, in the absence of due settlement of such complaints by representative national trade associations or their territorial administrative agencies, or otherwise; *(c)* to require reports necessary to determine compliance with or violation of this code; *(d)* to report violations of this code to the administrator of the aforesaid act, for its enforcement accordingly; *(e)* to recommend amendments to the code; and *(f)* to organize state trade administration of the code under its direction and subject to its approval; or to cause any of these things to be done subject to its approval.

(3) Each wholesale and retail grocer shall keep a record of his business transactions by such an accounting system as he may deem suitable in the circumstance, which will inform him of the essential particulars of his business, namely, purchase, totals, sales totals, and all operating expense totals, such as wages and rent.

Sec. 2. Any one in the food and grocery industry who violates this code shall be subject to the provisions of enforcement and penalty in the aforesaid Act.

Article VII—General Provisions

Sec. 1. This code shall be effective ten (10) days after its approval by the President of the United States. After said date every one in the food and grocery industry shall discontinue and refrain from any practice violative of this code. All contracts effective upon said date which violate this code shall be then void, except those made prior to June 16, 1933, which contracts (unless terminating prior thereto) shall not remain in force after Dec. 31, 1933.

Sec. 2. This code shall not require any one in the food and grocery industry to act in violation of another statute to which he is subject.

Sec. 3. This code shall not apply to export business.

Sec. 4. This code is subject to the following mandatory conditions, namely: (1) that employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; (2) that no employee and no one seeking employment shall be required as a condition of employment to join any company union or/to refrain from joining, or organizing, or assisting a labor organization of his own choosing; and (3) that employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President of United States.

Sec. 5. The President of the United States may cancel or modify this code at any time and in his discretion.

(The master code was made public too late to be mentioned on the contents page of this issue.—Editor.)